NETWORK WORLD
The Newsweekly of Enterprise Network Strategies
Volume 9, Number 15 — An International Data Group Publication — April 13, 1992

Utility crafts huge private SONET net

By Bob Wallace
Senior Editor

PARSIPPANY, N.J. — General Public Utilities Service Corp. (GPU) is building what it bills as the largest private Synchronous Optical Network (SONET) in the U.S.

The private 622M bit/sec SONET network will span Pennsylvania and northern New Jersey and support everything from local-area network interconnection, imaging and videoconferencing applications to voice communications.

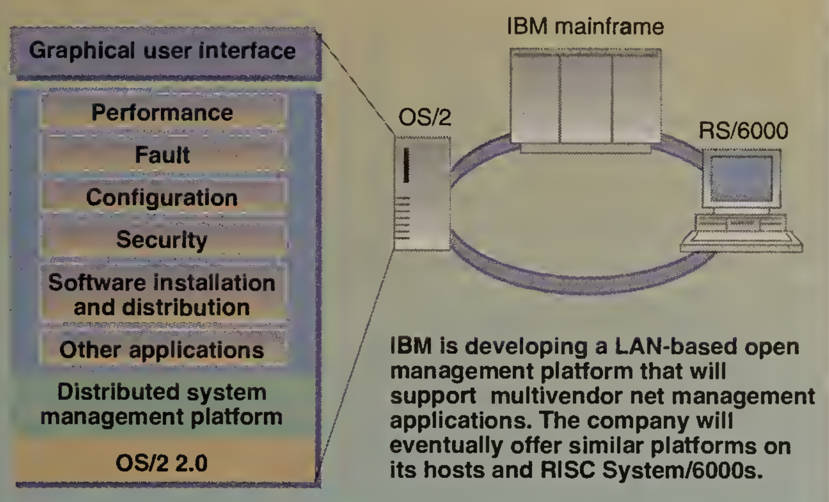
It will comprise a 300-mile backbone with 20 nodes at power substations and lower speed network spurs to 55 smaller sites, including administrative offices.

GPU made the monumental decision to migrate to SONET in an effort to leapfrog existing technology. The utility is running out of bandwidth on its primarily analog microwave net, which will be relegated to a backup role when the SONET network is completed later this year.

"The main reason we decided to go with SONET was to avoid ob-

(continued on page 50)

IBM bares management plan



IBM is developing a LAN-based open management platform that will support multivendor net management applications. The company will eventually offer similar platforms on its hosts and RISC System/6000s.

GRAPHIC BY SUSAN SLATER

SOURCE: IBM, RESEARCH TRIANGLE PARK, N.C.

IBM execs detail firm's LAN course for the '90s

By Caryn Gillooly
Senior Editor

RESEARCH TRIANGLE PARK, N.C. — IBM officials last week mapped out the company's future plans for LAN products, which include this month's expected release of support for 16M bit/sec token-ring nets on unshielded twisted-pair wiring and, later, a family of FDDI products.

At a briefing for *Network World* here, IBM executives also discussed other key local-area network areas that the vendor is exploring, such as wireless networks, multiprotocol net adapters and combination concentrator/LAN cards as well as new Ethernet products.

"You'll see a lot more this year in terms of what we're putting on the table," said Stuart Sager, manager of LAN planning and support for IBM's networking subsystems division.

First out of the manufacturing gate will be support for 16M bit/sec token-ring networks over unshielded twisted pair, which will be rolled out in two phases, ac-

(continued on page 49)

IBM prepping open LAN mgmt. platform

Distributed manager will support multivendor applications and be ported to other IBM systems.

By Michael Cooney
Senior Editor

RESEARCH TRIANGLE PARK, N.C. — By the end of the year, IBM is expected to unveil an open LAN management platform supporting applications from IBM and other vendors and announce new management applications that work with the platform.

IBM officials last week confirmed plans to introduce what they labeled a distributed systems management (DSM) platform that will give users a single point of control over local-area networks.

The platform, based on OS/2 Version 2.0, will include base management software and a graphical user interface and will support IBM and third-party applications written to IBM application program interfaces.

IBM executives claim that the LAN management platform will be more comprehensive than Novell, Inc.'s NetWare Management System (NMS), which was unveiled in February. They said environment-specific products, such as NMS and IBM's own LAN Network Manager, would run as applications on the platform.

Futhermore, officials said similar management platforms will be implemented on IBM main-

(continued on page 7)

MCI unveils international switched data service

Prices for MCI's 56K/64K bit/sec service slightly undercut AT&T's.

	First 30 seconds		Each additional 6 seconds	
	MCI	AT&T	MCI	AT&T
Japan	$2.57*	$2.70	$.24*	$.25
U.K.	$1.38	$1.45	$.20	$.21

*MCI estimate

See story, page 2.

SOURCE: MCI COMMUNICATIONS CORP. AND AT&T
GRAPHIC BY SUSAN SLATER

Firm readies client/server finance pack

By Timothy O'Brien
West Coast Bureau Chief

WALNUT CREEK, Calif. — PeopleSoft, Inc. will announce tomorrow what analysts are calling the first set of scalable financial applications that fully exploit a client/server architecture.

PeopleSoft's four integrated financial applications include code that runs on Microsoft Corp. Windows-based personal computers and works with data management software running on a mainframe, mid-range system or local-area network server.

The server portion will work with many of the leading SQL databases, giving users the freedom to upgrade the server platform as their processing needs change.

Sources close to the company

(continued on page 49)

NETLINE

▲▲▲

IBM ISSUES NEW release of Image and Records Management system, signs first non-government customer. Page 4.

FIBERCOM TO BOOST performance and lower the price of its RingMaster FDDI bridge. Page 4.

IBM MAKES COMDEX splash with OS/2 Version 2.0 and new connectivity tools. Page 4.

CONGRESS TAKES STAND on net reliability with bill that would require carriers to meet quality standards. Page 4.

IDEA WIDENS REACH of Concert cluster controllers via Ethernet gateway software. Page 4.

USAIR FIRST TO take off with in-flight digital voice/data services. Page 7.

NEWSPAPER

FEATURE

▲▲▲

Vendors revitalize subrate muxes with new features

By Bruce Guptill
Special to Network World

On one level, all multiplexers are created equal. They perform the same basic function of combining multiple input signals onto a single composite link.

Where differences surface, however, is in how the mux is used and its composite link speed. Although the advent of T-1 and T-3 multiplexers has all but obscured the market for low-end devices, interest in subrate muxes is being rejuvenated by the introduction of new and enhanced products that combine compressed voice, video, facsimile and local-area network traffic onto sub-T-1 circuits.

This new breed of subrate mux is finding wide use in international networking, especially for links to Europe, as well as at U.S. sites that cannot justify a full T-1.

(continued on page 35)

MCI launches int'l switched data service to Canada, U.K.

Service will be extended to Japan and 10 other nations by year end, cost twice as much as voice.

By Anita Taff
Washington Bureau Chief

WASHINGTON, D.C. — MCI Communications Corp. last week rolled out an international switched 56K/64K bit/sec offering for its Virtual Network (Vnet) and Prism I customers, plugging a gaping hole in its service line.

Although MCI has not publicly announced the service, the offering will initially be available from the U.S. to Canada and the U.K, according to a tariff filed with the Federal Communications Commission.

An MCI official said the carrier will also provide the service to Japan and 10 other countries by year end.

Today, the only choices MCI customers have in supporting applications such as international videoconferencing or bulk data transfer are low-speed dial-up lines or expensive international private lines. MCI has offered domestic switched 56K bit/sec service since October 1989 and domestic switched 64K bit/sec service since last May.

According to Susan Sirmai, senior manager for global product development at MCI, emerging applications such as videoconfer-

(continued on page 51)

Banyan to ink AT&T deal, roll out DCA-based gateway

Announcements to come at users group meeting.

By Bob Brown
Senior Editor

CHICAGO — Banyan Systems, Inc. this week will announce a strategic sales and support relationship with AT&T subsidiary NCR Corp. as well as a new gateway product based on technology from Digital Communications Associates, Inc., according to industry sources.

The announcements will be made at the Association of Banyan Users International/Association of Banyan Users of Canada Spring 1992 Meeting and Exposition here.

A Banyan spokeswoman confirmed the company will announce an alliance and make a product announcement but declined to give further details.

Banyan and AT&T are expected to enter a strategic relationship under which AT&T will sell Banyan's VINES net operating system in the U.S. and abroad. The carrier is also expected to provide support for VINES networks. The agreement will be similar to one signed last month by Banyan and Digital Equipment Corp., the sources said.

The AT&T agreement builds on a relationship established in

(continued on page 50)

Lotus Notes 3.0 to offer better NetWare integration

By Margie Wylie
Senior Editor

CHICAGO — As expected, Lotus Development Corp. last week hitched its wagon to Novell, Inc.'s ever-rising star with the announcement of two new versions of its Notes work group coordination program.

Notes 3.0, due by year end, will let clients send messages via Novell NetWare's Message Handling Service (MHS), said Terence Rogers, vice-president of Lotus' Communication Products Division. Next year, the Cambridge, Mass.-based company will offer Notes in a NetWare Loadable Module (NLM) version that will run on a NetWare 3.2 server in conjunction with Novell's NetWare Global Messaging (NGM) architecture.

Notes is a client/server application that offers users integrated and customizable conferencing, electronic mail and document tracking services on a local-area network. Notes' database allows these services, which would operate without knowledge of one another as if they were separate applications, to share information and a common directory structure.

(continued on page 51)

Briefs

Top official on telephone matters to leave FCC. One of the Federal Communications Commission's top officials, Common Carrier Bureau Chief Richard Firestone, has notified FCC Chairman Alfred Sikes that he is talking with two Washington law firms about possible employment. Firestone has removed himself from proceedings involving the firms, which will affect cellular communications, personal communications services and cross-ownership rules of cable television and telephone companies. There is also speculation that Sikes may be planning to leave the agency when his term expires in June 1993 to pursue other government posts or a political office.

BT buys Newbridge gear, readies new services. Newbridge Networks Corp. last week said it won a large contract from British Telecommunications PLC, which is said to be buying the Newbridge equipment to support a new breed of bandwidth-on-demand services. While neither party would provide details on the contract, analysts estimated it will be worth up to $120 million over three to five years and may be Newbridge's largest contract ever.

PacBell to conduct frame relay interoperability test. Pacific Bell last week announced it will trial its frame relay service with IBM's 3745 Communication Controller running the newest software release. The firm will use its frame relay service, which is not yet commercially available, to link 3745s at its major computer centers. Pacific Bell said the net will let it examine how the 3745 handles frame relay virtual circuits. Bulk file transfer will be the first application evaluated. Other areas to be explored include compatibility with Ethernet, long-distance transmission delay, network congestion and net management.

Sprint broadens calling card pilot. Pleased with early user reception, Sprint Corp. last week announced plans to increase the number of customers able to use its Voice-Activated FONCard from 5,000 to 50,000. The card allows customers to place calls by dialing an 800 access number, reciting a security code and then directing the system to call locations through spoken commands, such as "call home" or "call office." The current 5,000 callers have placed more than 300,000 voice-activated calls.

DECmcc to run under Ultrix and VMS. Digital Equipment Corp. this week is expected to unveil Version 1.2 of its DEC Management Control Center Director network management system ("DEC preps new version of net mgmt. system for Unix," *NW,* March 9). For the first time, Version 1.2 will run under DEC's Unix-based Ultrix operating system as well as VMS. It will also incorporate Simple Network Management Protocol support as a standard feature instead of as a separately priced option. Version 1.2 will also have 12 new management modules, including an autoconfiguration capability that automatically maps and registers DECnet and Transmission Control Protocol/Internet Protocol nodes.

Source book available. The Computer and Business Equipment Manufacturers Association last week released *The Information Technology Industry Data Book 1960-2002,* which presents a global analysis of computer and telecommunications hardware and equipment manufacturing as well as employment factors. A forecast of demand and economic trends through the year 2002 is also included. Call (202) 626-5730 for more information about the $155 book.

CONTACTS

▲▲▲

We want to hear from you. *Network World* has set up a toll-free number you can use to leave news tips or letters to the editor. Let us know what's going on or how you feel about the stories you read in our publication by calling (800) 622-1108, Ext. 487.

NW Bulletin Board. Contact us electronically. Our BBS lets you submit letters to the editor, pass on tips, leave change of address requests, interact with other readers, download free software and hunt for jobs. You can use your IBM, Apple or other microcomputer to reach the BBS at 300 to 2,400 bit/sec (8N1) by dialing (508) 620-1160 or at speeds up to 9.6K bit/sec by dialing (508) 620-1178.

CONTENTS

Data Net Architectures 9
Mgmt. tool uses AI to plot cable runs.
ICOT announces Windows version of 3270 emulator.

Local Networking 13
Univel developing user-friendly Unix.
Apple unveils secure A/UX for Macintosh networks.

Internetworks 15
Proteon quiets WAN broadcast storms.
Zenith to upgrade mgmt., offer new modules for hub.

Global Services 17
Frame relay faces national boundaries.
Users stew over carrier reregulation controversy.

Enterprise Applications 19
Sybase details plans to keep rivals at bay.
GeneSys extends imaging to DOS-based applications.

Industry Update 25
Standards groups fail to create int'l pact.
Intertel gains listing on American Stock Exchange.

Management Strategies 29
Harris reaps benefits from open systems.
Negotiating a price tag for outsourcing requires skill.

Opinions 32

Features 35

Action Center 42

Networking Marketplace 46

Networking Careers 48

REPRINTS

Article and chart reprints (minimum 500 copies) can be ordered from Donna Kirkey, Network World, Inc., 161 Worcester Road, Framingham, Mass. 01701-9172; (508) 875-6400.

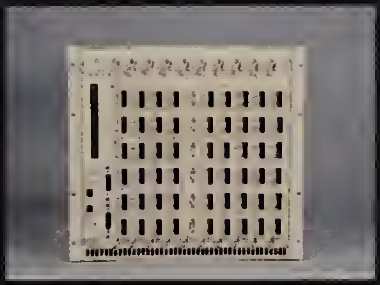
Back issues ($5 per issue) can be ordered from Bobbie Cruise by calling (800) 622-1108.

FOR SOME OF THE BRIGHTEST FDDI SOLUTIONS AVAILABLE, COME TO THE SOURCE. ODS.

Whether you need a high-performance campus backbone replacement or a LAN interconnect for workstations and mainframes, FDDI is the right technology.
And Optical Data Systems can provide the best solution for your networking requirements.

Thanks to our years of experience with Ethernet and Token Ring networking, as well as fiber optic and copper cabling, ODS is uniquely equipped to help you benefit from FDDI's advantages. With FDDI from ODS, your network performance characteristics are limited by your workstation's processor speed, not network constraints.

So call us at **214-234-6400**, and we'll show you some of the brightest FDDI solutions available anywhere.



ODS
OPTICAL DATA SYSTEMS

Richardson, Texas 214-234-6400 • Munich, Germany +49 89 319 5039
© 1992 Optical Data Systems, Inc.

IBM enhances IRM system to support Ethernet LANs

Signs on Duke Power as first nongovernment user.

By Wayne Eckerson
Senior Editor

CHARLOTTE, N.C. — IBM last week announced it has enhanced its Image and Records Management (IRM) system to support Ethernet and non-IBM token-ring local-area networks and has signed on Duke Power Co. as its first nongovernment user.

IRM is a client/server-based image and object management system that customers can use to electronically maintain and track digitized documents. Objects can represent text, structured data, images and, ultimately, video and audio files.

Users can import IRM files directly into applications running on their client workstations or store output of those applications in IRM object servers.

IBM's Systems Application Architecture-compliant IRM comprises an IBM DB2-based library server, which acts as an index to stored objects and their net locations, plus host or IBM OS/2-based object servers and presentation software that runs on client workstations under OS/2.

The new version of IRM includes support for Ethernet and non-IBM token-ring nets. Previously, the product only supported object servers and clients attached to IBM Token-Ring LANs. It also provides support for Microsoft Corp.'s Word and the Tagged Image File Format for storing binary documents.

IRM Version 1.3 allows users to customize the way they query the library server and provides several algorithms for determining which of the object servers in an enterprise net is best for storing individual objects. It also features enhanced queue management, scanning and print capabilities. Other upgrades include a Post-it feature that allows users to annotate objects with binary data from other objects.

The system also supports an application program interface to Scan-Graphics, Inc.'s Scanview software that lets users create digitized images of oversized engineering blueprints and view them on their workstations.

Users can employ IRM to build a variety of applications. State governments, for example, are using it in concert with imaging and character recognition sys-

(continued on page 50)

FiberCom to enhance its FDDI bridge

By Joanne Cummings
Staff Writer

ROANOKE, Va. — FiberCom, Inc. next month is expected to announce hardware and software enhancements to its FDDI bridge that will boost performance, lower the device's per-port cost and expand its connectivity options.

FiberCom's enhanced RingMaster Transparent Bridge will be able to forward Fiber Distributed Data Interface packets 75% faster than the previous version, support twice as many Ethernet ports and include a wide-area network port for the first time.

The firm is also enhancing the bridge's Simple Network Management Protocol management software, as well as providing a security and billing package that will let carriers that use the bridge, such as Metropolitan Fiber Systems, Inc., support metropolitan-area network services.

As with earlier versions, the enhanced RingMaster has four token-ring and two FDDI ports. But the new version will offer eight Ethernet ports and a card supporting V.35 and RS-422A interfaces that enables the bridge to connect to a WAN at up to T-1 or E-1 speeds.

The bridge features new software and hardware that will enable it to forward between 22,000 and 30,000 packet/sec, depending on the traffic mix. This is up from the 14,000 to 15,000 packet/sec previously supported, said F. Selby Wellman, corporate vice-president of marketing and sales at FiberCom.

Pricing — which ranges from $26,000 to $40,000 — will not change, resulting in a lower price-per-port ratio for the bridge, he added.

The firm is also expected to upgrade its ViewMaster+ SNMP bridge management software by incorporating Ingres Corp. database software.

The ViewMaster+ runs on a Sun Microsystems, Inc. SPARCstation and communicates with an SNMP agent residing on the RingMaster bridge. The new database holds all the bridge's Management Information Base variable data and will work with new decision support applications. These include ap-

(continued on page 51)

PREVIEW
INTEROP

IBM rolls out OS/2 V. 2.0, details net-related features

By Margie Wylie
Senior Editor

CHICAGO — Version 2.0 of OS/2, IBM's much-ballyhooed 32-bit operating system, got its official send off at Comdex/Spring here last week, along with some new and updated connectivity tools.

New features make OS/2 easier to use in a mixed network. It can run unmodified Microsoft Corp. Windows, DOS and IBM OS/2 1.3 applications, including existing network clients for Novell, Inc. NetWare, Banyan Systems, Inc. VINES and IBM LAN Server.

The new Workplace Shell is the desktop portion of a graphical user interface that iconically represents all services and applications available to a user through any of the environments that OS/2 Version 2.0 supports. Users just drag and drop files from server to server and from server to printer. They do not have to know that a file belongs to a Windows' application or that their NetWare client software is running under DOS in order to use them.

LAN Server 2.0 also shipped last week. The new network operating system offers disk mirroring, support for Windows clients and uninterruptible power supplies, including network alerts and automatic shutdown.

LAN Server Entry Level, which uses the file system jointly developed by IBM and Microsoft previous to their split, costs $995. The High Performance Server is priced at $2,295 and uses a new file system IBM

(continued on page 51)

COMDEX
Spring

Congress takes network reliability into own hands

By Anita Taff
Washington Bureau Chief

WASHINGTON, D.C. — Growing weary of FCC inaction, Rep. Edward Markey (D-Mass.) last week introduced a bill that would require carriers for the first time to live up to minimum national quality standards and compensate users for network outages.

In a separate move last week, the International Communications Association and the Consumer Federation of America asked the Federal Communications Commission to force local carriers to publish net performance standards in their tariffs.

"In the absence of tariffed standards against which to measure the performance of lines, users are handicapped in their ability to require a LEC to repair or replace these circuits," the filing stated.

The bill and petition are the outgrowth of an increasingly restless user community that is angry about the lack of progress concerning network reliability. During the past two years, users have been rocked by nine catastrophic outages and several smaller ones that cut off local and long-distance service to millions of people for several hours. Markey's bill would require the agency to appoint a staff member to develop and monitor national service quality standards.

The bill would also require carriers to reimburse users for outages affecting 25,000 or more lines for at least 60 minutes. Carriers would have to refund a quarter of a customer's previous month's bill for outages less than six hours, half the previous month's bill for outages lasting between six and 12 hours, and the total previous month's charges for outages extending more than 12 hours. In addition, if the FCC determines that the outage was caused by carrier negligence, the agency may impose a fine not to exceed $10,000 per minute of service disruption.

Lawmakers first asked the FCC to examine ways to prevent outages last October. Now, six months later, many users and lawmakers say the FCC has done

(continued on page 50)

IDEA rolls out Ethernet support for Concert line

By Jim Duffy
Senior Editor

BILLERICA, Mass. — IDEA last week made another move for IBM's turf by unveiling software for its Concert cluster controllers that allows users on Ethernet LANs to access and share data with IBM host computers.

Release 1.2.3 of Concert software enables the controllers to act as a gateway to a host for local or remote local-area networks. The controller can attach to mainframes and mid-range hosts via Synchronous Data Link Control lines as well as to an IBM mainframe channel.

The company claims the software can cut networking costs by reducing the number of leased lines users need to access IBM hosts from desktop systems.

"Our vision is to unify customers' SNA networks and LAN internetworks into one," said David Berman, IDEA's director of internetwork products.

A jump on the competition

Previously, Concert only connected token-ring LANs to IBM hosts.

By adding Ethernet support, however, IDEA has leapfrogged IBM's 3174 and 5X94 controllers, which only attach Token-Ring LANs to mainframes and mid-range processors, respectively.

Release 1.2.3 also allows IBM 3270 terminals to emulate IBM 5250 terminals so they can access data on mid-range systems as well as mainframes.

> "Our vision is to unify customers' SNA networks and LAN internetworks into one," IDEA's David Berman said.
>
> ▲▲▲

Concert's new LAN features had been expected ("IDEA tunes up its Concert cluster controller family," *NW*, April 6).

The Concert family is currently positioned as an alternative to the 3174 and 5X94 controllers,

(continued on page 51)

Do you spend at least $2,000 on international calls a month? Would you like to save as much as 30%* on all those calls? If so, do what Faden & Faden just did. Upgrade your telecommunications service to AT&T **MEGACOM**® WATS.

With **MEGACOM** WATS your phone service is enhanced with T1.5 technology to give you direct access to the AT&T Worldwide Intelligent Network. The results are lower rates based on 6-second billing (which begins after an initial 30-second period), clear connections, quick call setup and the capacity to transmit high quality data and facsimile.

Best of all, if you sign up by June 13, 1992, AT&T will hook you up for free. That could save you as much as $2,000. (You must request an installation date no later than September 13, 1992, and maintain service at a $1,900 per month average for 6 months.) For more information contact your AT&T Account Executive or call **1 800 952-4275.** And take a financial tip from Faden & Faden.

The **MEGACOM** WATS
Savings Plan.
A World of Help℠ from AT&T.

AT&T

*Savings as compared to AT&T ILD rates.
MEGACOM WATS savings vary based on your current usage and the length of your commitment.
© 1992 AT&T

Total Multivendor Networking Solutions Start with Gandalf.

Gandalf Access Manager Does It All…
and That's Just the Beginning.
In today's rapidly changing information environment, you need a company who understands local area networks, wide area networks, and the demanding issues of internetworking. A company who can deliver solutions today, with an open path towards tomorrow.

Complete Access to All Your Networking Solutions.
Innovative Gandalf Access Series products offer a unique building-block approach that lets you cost-effectively create and interconnect networks as you need them.

The impressive Access Series product line lets you build a LAN today using intelligent wiring hubs with integrated local or remote bridges and integrated multiprotocol routers for LAN, WAN, Token Ring and Ethernet* routing.

The Infotron Series of WAN solutions connects all of these and brings you the industry's first multimedia hub, the 2120 offering voice, LAN and data in a single unit. And with the 2300 Frame Relay Concentrator, you make the most effective use of expensive trunk lines.

Access to Tomorrow.
Best of all, the Access Series and your multivendor products can be managed by Access Manager, a dual-architecture system utilizing SNMP and OSI protocols. Your equipment investment is fully protected today and tomorrow as more and more companies migrate from SNMP to universal OSI enterprise networking standards.

Call today for more information about Access Manager, and other products in the Access and Infotron Series. **US:** 1-800-GANDALF; **Canada:** 1-613-723-6500; **UK:** 44-344-860272; **Netherlands:** 31-20-6867611; **France:** 33-1-47-60-0032; **International:** 44-344-874606.

gandalf
Open Networks
for Open Minds

*Ethernet is a registered trademark of Xerox Corporation.

USAir preps new air-to-ground digital services

By Ellen Messmer
Washington Correspondent

WASHINGTON, D.C. — USAir, Inc. next week will demonstrate a next-generation air-to-ground digital voice and data services that it may eventually roll out across most of its fleet.

In a USAir Boeing 757 where each seat is outfitted with a computer tied to a local-area network and each armrest has a telephone, the flight crew will demonstrate new information services geared to business travelers.

On its inaugural flight over the Capitol region here, USAir plans to showcase a news and stock quote service, dial-up data communications for passengers with laptop computers, digital voice service and an outbound 180-character-maximum Faxgram service.

The services will be provided via In-Flight Phone Corp.'s network, marking the start of competition for in-flight phone service. The only other air-to-ground service available today is an analog offering from GTE Airfone, Inc.

In-Flight Phone used DeskTalk Systems, Inc. to provide the network design for the plane. An IBM XT-compatible computer is encased in each seatback with only a personal computer LCD screen visible to the user. Instead of a keyboard, there is a handset stored in the armrest that doubles as a phone and data-entry device.

Passengers can also plug their laptops into a local data port and use their own keyboards to interact with the system.

The seatback PCs are linked to a battery-powered, ruggedized 386SX network server built by Texas Microsystems, Inc., which controls radio transmissions with the ground.

A small antenna beneath the plane is used to exchange voice and data traffic with the nearest base station in In-Flight Phone's 65-base station network, from which transmissions are forwarded over a terrestrial network. Data transmission rates are limited to 400 bit/sec.

Telephone calls will cost $2.00 per minute with no setup charge, and Faxgrams will cost $1.50. Pricing for other services was not available.

Air-to-air combat

If USAir receives Federal Aviation Administration approval for the service — expected to be granted next month — and the service proves popular, USAir will install In-Flight Phone systems on most of its fleet. American Airlines, Inc. and Northwest Airlines, Inc. are also adding In-Flight Phone systems to some planes.

Oakbrook, Ill.-based In-Flight Phone is footing the bill for the new installations in an effort to win airline industry support. Since planes can carry only one service provider's equipment, a dogfight is expected to break out between GTE Airfone and In-Flight Phone.

Eventually, they may be joined by four other carriers — including Clear-Tel Communications, Inc. — which were licensed by the FCC to compete in the 849-MHz to 851-MHz and 894-MHz to 896-MHz bands. An FCC-approved spectrum sharing plan proposed by In-Flight Phone Chairman and Chief Executive Officer Jack Goeken led to the current competitive environment.

"We showed that we wouldn't have a problem," Goeken said, adding that he battled GTE Airfone on the issue, which told the FCC that spectrum sharing could not be done. Goeken founded the company and eventually sold it to GTE Corp. ◻

IBM prepping open LAN mgmt. platform

continued from page 1

frames and other processors, such as the RISC System/6000 and Application System/400. These systems will share information with one another to support enterprise network and systems management.

IBM executives declined to reveal the actual name of the LAN management system or discuss pricing. But they said it would be introduced this year and confirmed that the company will also unveil new applications that will run atop the platform for such chores as software distribution.

"IBM's strategy is to provide full system management capability for applications, operating systems and the network and bring it under one umbrella," said Al Rosen, an IBM product planner with the company's LAN systems division, based here. "This gives us one platform with a single interface to the underlying transport and management facilities."

Rosen said the platform is SystemView-

(continued on page 49)

simple as

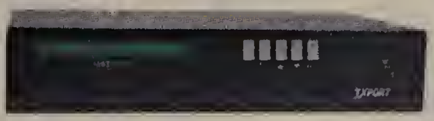
TxPORT's Data T® products make the most formidable applications seem like child's play.

A

The TxPORT **1564A Data T** combines a powerful feature set with an easy-to-use interface, making it an excellent choice for fractional T1 network access. The 1564A provides the unique capability to interface with up to three DSX T1 facilities and perform drop, insert, and bypass of any combination of DS0 channels between these ports and rate selectable, high speed data ports.

- The solution for T1 Integrated Access: Fractional T1, video, CAD/CAM , LAN extension, , frame relay, DDS, voice, and more.
- Provides complete diagnostic performance monitoring on DS1 lines.
- Built-in BERT capability for high speed port testing.

B



The TxPORT **1563 Data T** combines all the great features of the 1564A with one or two integral CSUs. These CSUs provide TR54016 and T1.403 compliant network interfaces along with additional loopback testing capabilities and front panel test jacks. Like the 1564A, its high speed data ports are programmable for V.35, RS449, and EIA530 compatibility.

- Provides three port DSX1 cross-connect.
- Allows drop and insert of up to 48 DS0 channels to three high speed ports.
- D4 or ESF framing, AMI or B8ZS line coding.
- Customer and Telco access via ESF data link.

C

The TxPORT **1565A Subrate Data Multiplexer** connects to the 1563 or 1564A to accommodate up to 20 low speed RS232 lines multiplexed into a single DS0 channel. Additional 1565A SDMs may be added to support up to 320 low speed channels from a single Data T unit.

- Data rates from 1.2 to 38.4 Kbps.
- Supports point-to-point as well as DDS applications.

TXPORT

125 West Park Loop
Huntsville, Alabama 35806
205-837-2755 / 800-926-0085
FAX 205-837-4120
Sales and Services Worldwide

UDS brings more to the table in the V.32 *bis* modem game

	Max Thruput	Rack-Mountable	V.25 *bis* Autodial	Dial Backup	Remote Config.	Call Security	LCD Display
UDS V.3229	57.6K	●	●	●	●	●	●
Digicom 9624E +	38.4K	●	●	●			●
Hayes Ultra 144	38.4K		●				
Microcom QX/4232 *bis*	38.4K	●				●	
U.S. Robotics Courier V.32 *bis*	38.4K	●					
Telebit T3000	57.6K	●			●	●	

Registered trademarks are the property of their respective owners.

Modems that comply with the CCITT V.32 *bis* recommendation (and there are lots of them) share some common characteristics: 14.4 kbps basic rate, with compressible automatic fallback speeds; V.42 *bis* and MNP® level 5 data compression; sync or async full-duplex operation over two- or four-wire circuits and Hayes "AT" auto-dialing.

As these similarities drive value-conscious modem buyers to look beyond the common features, the search for added performance advantages brings them to the UDS V.3229.

In addition to the "standards," UDS offers a suite of features—automatic dial back-up, remote configuration capability, call security etc.—that is simply not available in competitive models.

If you're a modem buyer who understands that there's more to value than just price, UDS will happily rig the V.32 *bis* game in your favor.

For detailed specifications and a winning price/performance quote, contact UDS at

800/451-2369

UDS

MOTOROLA

DATA NET ARCHITECTURES

NETWORK ARCHITECTURES, DATA NETWORK EQUIPMENT, STANDARDS AND ENTERPRISE NETWORK MANAGEMENT

Worth Noting

> "IBM has always specialized in showing users a picture of what the puzzle looks like when it's done, then giving them the pieces one at a time over a period of years."

Tom Nolle
President
CIMI Corp.
Voorhees, N.J.
Commenting on IBM's
Advanced Peer-to-Peer
Networking blueprint
announcement

Data Packets

Digital Equipment Corp. last week brought out an Ultrix version of its Reliable Transaction Router software, which provides fault tolerance across wide-area networks.

Reliable Transaction Router for Ultrix software is said to ensure application availability in real-time computing environments in the event of a disaster at a site. The product protects data from failures in systems, software and net infrastructure within distributed computing environments.

The Ultrix version of the client software enables networked Ultrix workstations to initiate transactions and send messages to a VMS-based VAX acting as a router.

The VAX router directs the transaction to the appropriate server or, if the primary server is down, to a backup server.

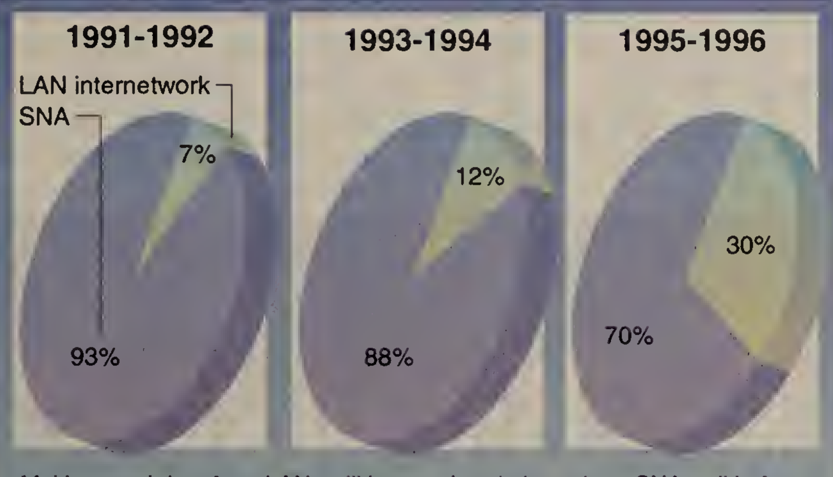
Reliable Transaction Router for Ultrix software is available now and is priced at $630.

AT&T Paradyne last week said it plans to develop a 14.4K bit/sec credit card-size modem for notebook computers.

The modem will have data

(continued on page 10)

SNA still king of the WAN



Multiprotocol data from LANs will have to break through an SNA wall before becoming the predominant type of WAN traffic, according to interviews with 54 executives from large U.S. firms with more than 50 branch offices.

GRAPHIC BY SUSAN J. CHAMPENEY SOURCE: FORRESTER RESEARCH, INC., CAMBRIDGE, MASS.

ICOT announces Windows version of 3270 emulator

Includes configuration utility, customized profiles.

By Joanne Cummings
Staff Writer

CHICAGO — ICOT Corp. introduced at last week's Windows World '92 show here a Microsoft Corp. Windows-based version of its personal computer-based 3270 emulation and host communications software.

The new version of OmniPATH for Windows includes a new configuration utility and the ability to customize and save software profiles pertaining to different types of mainframe sessions. Thus, instead of setting up the session parameters for each type of application, such as CICS or TSO, a user can click on a customized icon and instantly begin the session, said Kenn Dahl, vice-president of marketing at ICOT.

OmniPATH for Windows is software that runs on either a stand-alone or local-area net-attached PC configured with Windows 3.0 or 3.1. Like the company's previous OmniPATH for DOS product, it lets the PC emulate a 3270 terminal and communicate with an IBM mainframe.

The new product offers an automated configuration utility, called QuickStart, which examines the PC's configuration file to identify what hardware and software is installed. For example, it can detect what Synchronous Data Link Control board is installed and configure the host connections accordingly. Previously, that was a manual, time-consuming process, Dahl said.

Users can also save customized sessions for different mainframe applications as icons and then simply click on the icon to invoke the OmniPATH for Windows emulator and communicate with the mainframe application.

The product takes advantage of Windows' Multiple Document Interface to enable the user to manage as many as 26 sessions from a single menu, including as many as five concurrent sessions with more than one host. For example, users on a Novell, Inc. Internetwork Packet Exchange (IPX) or Network Basic I/O System LAN could link to a mainframe through a LAN gateway while communicating with another host via a direct attachment to a controller.

In addition to IPX and NETBIOS, OmniPATH for Windows supports a wide range of connectivity options, including SDLC.

Scheduled to ship this summer, the product is priced at $395 for a single-user license, $1,995 for a 10-user license and $2,995 for a gateway license.

> Users can save customized sessions for different mainframe applications as icons.
>
> ▲▲▲

Mgmt. tool uses AI to plot cable runs

ISICAD's Command 5000 also to be integrated with Cabletron's Spectrum net mgmt. system.

By Joanne Cummings
Staff Writer

WASHINGTON, D.C. — ISICAD, Inc. next month plans to introduce a new version of its Command 5000 network management system that uses artificial intelligence to help users choose optimal cabling configurations.

The company is also expected to demonstrate at INTEROP 92 Spring here a new interface that integrates Command 5000 with Cabletron Systems, Inc.'s Spectrum network management product.

Command 5000 Version 2.1, like earlier versions, runs on workstations from ISICAD, Hewlett-Packard Co. or Sun Microsystems, Inc. and aids users in network design, cable layout and change management. It can be used to manage an entire physical network, including telephone systems, as well as local- and wide-area networks.

The software features a graphical user interface that can display cabling configurations and a relational database that documents the physical components of the network, including all net devices, cabling routes and connections.

The graphical display can show changes in cable configurations as they occur, according to George Christensen, product manager at ISICAD.

With its new configuration capabilities, Version 2.1 can automatically determine the best cabling configuration to support a new LAN station, for example, Christensen said.

"If I want to connect a PC to a server, I simply say, 'Connect me,' " he explained. The user specifies the beginning and end points of the connection, and the software determines the most appropriate cabling path. The system then graphically displays the connection for the user and, if the user approves, will print out a work order for a technician.

"The user doesn't need to follow the cabling to find out where

(continued on page 10)

DEC preps its relational database for multimedia

By Jim Duffy
Senior Editor

MAYNARD, Mass. — Digital Equipment Corp. has unveiled software that allows its Rdb relational database to store multimedia data, such as digitized images and voice.

SQL Multimedia Development for Rdb/VMS Version 1.0 enables applications on DOS, Apple Computer, Inc. Macintosh, Ultrix, VMS and Microsoft Corp. Windows clients to store and retrieve multimedia data from Rdb databases.

SQL Multimedia allows Rdb for the first time to store compound documents, text, images or spreadsheets.

The software complies with ISO specifications for compound documents and digitized images, according to DEC.

The new multimedia software also adds an algorithm to Rdb that allows the database to compress and decompress large amounts of image data in order to reduce storage requirements for multimedia applications.

Flat-file structures

Currently, users and applications developers store multimedia data in flat-file structures, which are cumbersome, according to Vickie Farrell, DEC manager of Network Application Support product marketing.

Flat-file users and developers have to write additional code for adding data integrity and security features, in addition to connecting related data files to each other, Farrell said.

Data security and integrity — in addition to the paths between related data files — are already

(continued on page 10)

Data Packets

continued from page 9

compression capabilities that enable it to support an effective data transmission rate of 57.6K bit/sec, AT&T Paradyne said. Current credit card modems operate at only 2,400 bit/sec.

The modem will support data and facsimile transmission over public switched and cellular telephone networks.

AT&T Paradyne will offer the modem to manufacturers of notebook computers on an OEM basis. It will be available in August.

Simpact Associates, Inc. last week unwrapped software that allows Digital Equipment Corp. DECstation 5000s to connect to wide-area networks that provide access to industry-specific applications.

The software provides the DECstation 5000 with physical- and link-level protocols to connect to specialized financial, government and commercial networks. Support is included for financial market networks, such as Dow Jones & Company, Inc.'s Telerate International Quotation and Reuters Holdings PLC's Reuters Marketfeed, as well as government satellite and ground communications networks, and X.25 and DEC's DECnet networks, Simpact said.

The software is available now. Prices start at $2,100. ☑

Mgmt. tool uses AI to plot runs

continued from page 9

it leads and whether the connection will work," he said. "Command does that automatically."

Version 2.1, which will be available next month, ranges in price from $25,000 to $40,000 per management station. It is free of charge to current users that hold a software maintenance agreement with the company.

ISICAD will also demonstrate Command 5000's integration with the Spectrum network management system. A new software interface links Command 5000 with Spectrum, enabling users to manage the entire enterprise net, including the physical cabling, from Spectrum's console, Christensen said.

For example, a user at a Spectrum console may be alerted to a network problem, such as a station that is no longer operating. By clicking on the Command 5000 icon at the Spectrum console, the user can view the physical portions of the surrounding network area and determine the cause of the problem, such as a loose cable.

> The user can view the surrounding network area and determine the cause of the problem.
>
> ▲▲▲

Availability of the Command 5000 interface for Spectrum will coincide with the debut of Spectrum Version 1.1 in June ("Cabletron offers modular, less expensive Spectrum," *NW*, April 6).

The offering is priced at $10,500. ☑

DEC preps its database

continued from page 9

coded into relational databases, Farrell explained.

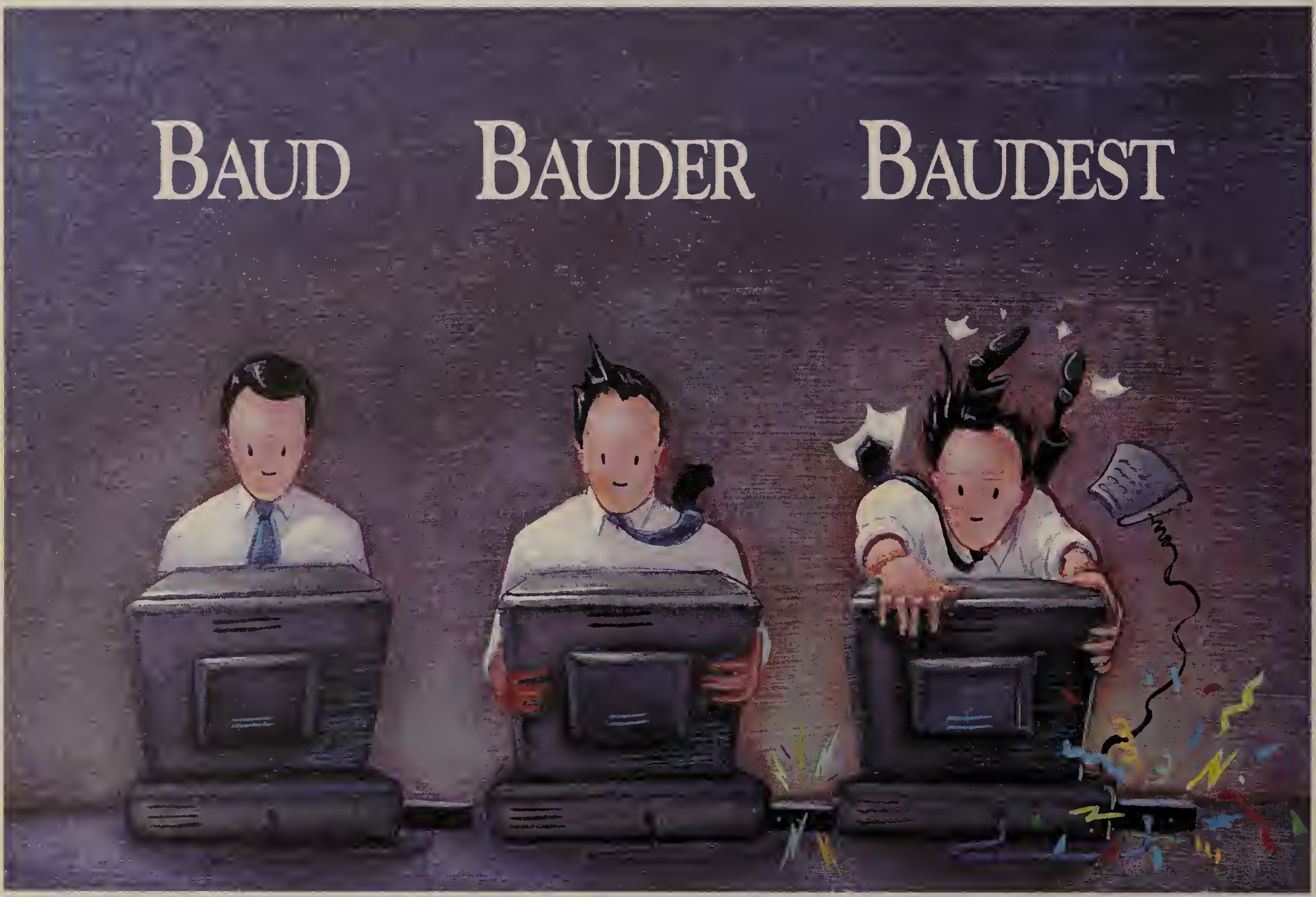
Relational databases also offer users concurrent access to large data files.

Various applications

SQL Multimedia is targeted at numerous industries. It can be used in applications such as traffic violation billing or fingerprint tracking, whereby a law enforcement agency queries the database to match prints found at a crime scene.

In the former application, a camera at a tollbooth can photograph the license plate of a car whose driver fails to pay the toll and sends the image to an Rdb database. The data on the license plate can then be easily matched to the driver and a fine sent to that person.

A development version of SQL Multimedia will be available in June, with pricing starting at $3,530. A run-time version, which starts at $530, will also be available in June. ☑



Announcing Three New Modems From Multi-Tech

The best just got better! Our newest intelligent modems, the MultiModemIIs, give you more performance and value, in a smaller package.

There's A MultiModem II For You

- MT224 Series: Our 2400 bps error-correcting, data-compressing workhorses.
- MT932 Series: 9600 bps V.32 modems - full standards compatibility and extraordinary performance.
- MT1432 Series: 14,400 bps V.32bis, for your most demanding high-speed applications.

The new MultiModemIIs feature V.42bis "4-to-1" compression and 9600 bps fax capability (optional on MT224 Series). The 9600 and 14.4K bps modems include special settings for UNIX® UUCP or IBM® AS/400™ applications. And with their new aluminum chassis, low power consumption and extensive use of VLSI surface-mount technology, all three modems are built to last!

And that's not all. Please call us at (800) 328-9717 (in Minnesota, (612) 785-3500) for more information.

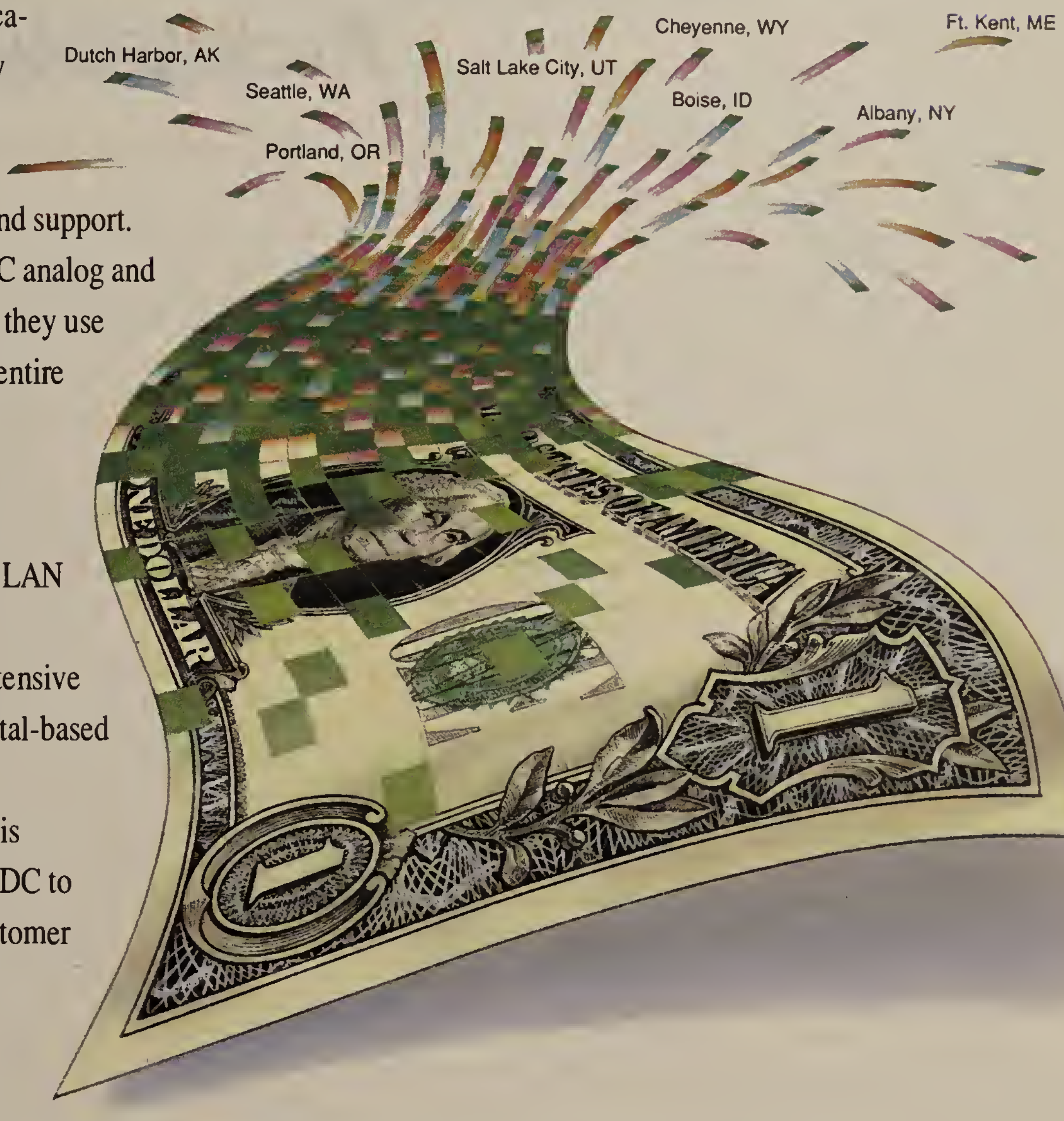
MultiTech® Systems

Multi-Tech Systems, Inc., 2205 Woodale Drive
Mounds View, Minnesota 55112 U.S.A.
(612) 785-3500, (800) 328-9717, U.S. FAX (612) 785-9874
International Telex 4998372, International FAX (612) 331-3180

Trademarks: MultiTech, MultiModem: Multi-Tech Systems, Inc.; UNIX: UNIX System Laboratories, Inc.; IBM, AS/400: International Business Machines Corp.

WHY KEYCORP IS BRANCHING OUT WITH GDC.

With branches reaching from Fort Kent, Maine, to Dutch Harbor, Alaska, KeyCorp – "America's neighborhood bank"℠ – is one of the fastest-growing financial institutions in the U.S. Whenever KeyCorp adds another branch to the 730 Key Bank offices it already has, it relies on GDC to help quickly achieve "backroom standardization."



KeyCorp managers consider their communications network a major strategic asset. And they know it's vital to get each new bank integrated as quickly as possible. That's why they turn to GDC, their strategic partner for networking products, services, and support.

KeyCorp planners have standardized on GDC analog and digital access products. For their backbone network, they use the GDC Transport Management System. And their entire network is managed by a GDC Integrated Network Management System.

GDC supports LAN-to-WAN connectivity for internetworking of all KeyCorp offices. Each includes LAN traffic, voice, image, and other data applications.

GDC is also helping KeyCorp convert its extensive regional data enterprise network from analog- to digital-based technology.

Through its 6-year partnership with GDC, this innovative financial services company has utilized GDC to help lower costs, speed up performance, enhance customer service, and improve its edge in a highly competitive banking environment.

KeyCorp has found that GDC has the right products, the right network architecture, and the right vision to offer a reliable migration path to the communications technologies of the future. We think you'll find the same.

General DataComm's world class networks connect businesses and telephone companies in more than 60 countries. To connect with GDC, call 1-203-792-0542. In North America, call toll-free 1-800-777-4005.

General DataComm

WORLD CLASS NETWORKING

WORLD HEADQUARTERS 1-203-574-1118 HONG KONG 852-526-5511 CANADA 1-416-498-5100 AUSTRALIA 61-2-956-5099 UNITED KINGDOM 44-734-774868
EUROPE, AFRICA, MIDDLE EAST HEADQUARTERS 33-1-30570200 JAPAN 81-33-862-1730

See Us At TEXPO '92, Booth #619

Try Explaining To Your CEO That Network Response Time Is Poor Because Your Routers Don't Have A Symmetric Multiprocessor Architecture.

Most router vendors give you two ways to deal with network growth, neither very appealing. Either spend big bucks on a new router, or stay with what you have and learn to live with progressively slower performance. Wellfleet, on the other hand, lets you expand your networks without degrading performance simply by adding processor modules to your existing routers. That's the kind of flexibility inherent in our advanced symmetric multiprocessor architecture. For a Wellfleet Architecture Report, please phone **1-800-448-3400, ext. 478W.** It will explain everything.

WELLFLEET Communications

When Your Networks Are Complex, Your Choice Is Simple.

© 1992 Wellfleet Communications, Inc., 15 Crosby Drive, Bedford, MA 01730-1401. All rights reserved.

LOCAL NETWORKING

LAN HARDWARE, NETWORK OPERATING SYSTEMS AND LAN MANAGEMENT

Worth Noting

This is not your father's IBM, reads a sign in a local-area network product test laboratory located at an IBM facility in Research Triangle Park, N.C.

Netnotes

Fresh Technology Co. and **McAfee Associates** have jointly released Antivirus Assistant, which provides centralized detection and removal of more than 1,200 known viruses. The software allows a local-area net administrator to detect and remove viruses from networked personal computers.

Antivirus Assistant, which is designed to run in a Novell, Inc. NetWare environment, is a bundling of Fresh Technology's Map Assistant and LAN Assistant Plus, along with McAfee's ViruScan, NetScan and Clean-Up. It is available now for $1,995 from Fresh Technology in Gilbert, Ariz.

Madge Networks, Inc. last week added on-board support for Smartrom and unshielded twisted-pair cabling and increased the memory capacity of its 32-bit Smart 16/4 EISA Ringnode token-ring card. Smartrom is the firm's optional remote-boot read-only memory that lets diskless workstations boot remotely from a server. With the card's Smartrom support, the boot ROM code in each workstation may be centrally updated.

According to Madge Networks, based in San Jose, Calif., the card's memory capacity has also been increased from 128K to 256K bytes.

The new features are available now on the Smart 16/4 EISA Ringnode card, while the price has remained at $1,295 per card individually or $1,195 per card when purchased in a five-pack.

Novell's different levels of Unix support

"UnixWare"	Off-the-shelf Unix operating system expected later this year that will run natively in Novell, Inc. NetWare environments.
NetWare NFS	A NetWare Loadable Module that lets Unix Network File System users access NetWare-based file and print services.
LAN Workplace	Workstation TCP/IP software that lets NetWare and other non-Unix clients access Unix-based applications and resources.
NetWare for Unix	A source-code application that lets Unix systems emulate NetWare 3.X functionality. Novell, which neither supports nor sells the product, provides it to other companies on an OEM basis.

GRAPHIC BY SUSAN J. CHAMPENY

Apple unveils secure A/UX for Macintosh networks

New version meets government security standards.

By Caryn Gillooly
Senior Editor

WASHINGTON, D.C. — Succumbing to increasing user demand for network security, Apple Computer, Inc. recently rolled out a secure version of its A/UX Unix operating system for networked Macintosh environments.

A/UX 3.0 Secure offers the same basic functionality as A/UX 3.0 but is geared toward the network user and includes password protection, audit security enhancements and other features that help it meet government C2-level networking security standards.

In fact, according to David Powell, A/UX engineer at Apple's Federal Systems Group in Reston, Va., end users will see no difference between A/UX Secure and nonsecure versions as logging on and navigating through networks using either operating system will be the same.

"If security's not easy to use, people won't use it," he said.

A/UX 3.0 Secure has three primary enhancements that give it C2-level security: an audit subsystem, user identification and authentication, and password management.

First things first

The most important security feature is probably the audit subsystem, which automatically logs and reports all security-related events that occur on a network. For example, the subsystem will log the time and date of all successful and unsuccessful logons.

Once a user has logged on, the system's user accountability and privilege information functions can trace all network actions to a single identifiable user.

By using its audit-trail information feature, the system can also reconstruct corrupted data if someone has broken into the network.

According to Apple, the administrator can also customize the system, depending on the company's needs.

"The audit system can be tailored to audit as much or as little as you want," Powell said.

The user ID and authentication features are implemented to ensure that users are actually who they claim to be. The system achieves this by automatically locking a user out after repeated unsuccessful logon attempts. The administrator has the option of assigning password expiration dates and generating random-character passwords.

The secure system also provides a protected-password database as part of the password management facilities. Within this database, the administrator can keep a record of not only passwords, but also user and system characteristics.

The Apple connection

A/UX is basically Unix for the Macintosh that combines features from both AT&T Unix System V and Berkeley Software Distribution 4.3. A/UX lets the user simultaneously run Macintosh, Unix and MS-DOS applications, with each appearing within a window on the Macintosh user interface.

Apple bought the C2-level security software from Atlanta-based SecureWare, Inc.

A/UX 3.0 Secure is expected to be available in the fourth quarter, at which time pricing information will be released.

Univel developing user-friendly Unix

Novell, USL joint venture working on personal and server versions of new 'Unix for the masses.'

By Margie Wylie
Senior Editor

CHICAGO — Four years ago, industry pundits were predicting Unix would be on every desktop, but the truth is that the operating system has fallen short of that expectation in high-volume commercial markets because it is still too cryptic and too expensive.

That is why Novell, Inc. and Unix Systems Laboratories, Inc. (USL) created Univel, a joint venture that aims to steal the highly networkable operating system from the engineering and academic gods and place it into the hands of those mortals more often found using Microsoft Corp. Windows instead of Unix and Novell NetWare servers instead of minicomputers. And that is why Univel was evangelizing its products to developers here at Comdex/Spring last week.

"Our aim is to come up with a desktop strain of Unix that isn't so damned hard to use," said Kanwahl Rekhi, a Novell vice-president of the communications products division who helped launch the joint venture.

"Unix for the masses," as Rekhi refers to Univel's Unix, will come in both a personal and server version. Another Univel official, however, referred to the product as "UnixWare" during a demo at the Novell developer's conference in Salt Lake City last month.

Based on USL's System V Release 4 kernel technology — code-named Destiny — both offerings are due late this summer but remain unpriced and unnamed, according to Univel President Joel Applebaum. Both will run on Intel Corp.-based personal computers and combine the best of Unix and NetWare, Applebaum said.

The personal version will incorporate both Unix's peer-to-peer networking services and a direct link to NetWare services through an Internetwork Packet Exchange (IPX) protocol stack, he said.

It will also offer its own graphical desktop from which users can switch between the Open Software Foundation, Inc.'s Motif or Sun Microsystems, Inc.'s OpenLook environments. A DOS emulator will let users run DOS or Windows applications.

How it stacks up

Univel's client operating system, however, does not stand much of a chance against Microsoft's Windows NT, said Jamie Lewis, vice-president of information services at The Burton Group, a Salt Lake City-based consultancy. Feature for feature, the two are comparable, he said, but Novell simply cannot break Window's grip on the desktop.

"They're dreaming on the client," he said. "It's like starting to build a race car the day the Indy 500 starts; you can't compete."

Where Univel stands the greatest chance for success is with its Unix server, which will offer built-in NetWare services in a secure, distributed, general-purpose operating system running on an Intel 80386 or higher PC, according to Lewis.

"[NetWare Loadable Modules] have their uses, but they're not the best platform for application services," Applebaum said, adding that NLMs have been known to conflict with one another, for example.

Univel's Unix will give developers the flexibility and power they need to create customized applications that can run a business "ranging from McDonald's to a financial institution," he said.

According to Lewis, the new server also presents Novell with the opportunity to move its NetWare services to a Unix platform, which has low-level services that it can mesh with, rather than riding on layers of software that can slow it down.

"This gives [Novell] the opportunity to really tie NetWare into a Unix kernel and make a better Unix," he said.

Univel will also ship a developer's kit for creating applications that run in both environments when it delivers its first limited release in June, Applebaum said. General availability of the two offerings will be in the third quarter.

REAL POWER FOR SMALL BUSINESS

PUSH SOME HOT BUTTONS

Meet the NEW SX-200™ LIGHT. Now Real Telephone Power Is Accessible to Small Business.

Why should big business get all the breaks? If you have less than 100 employees, Mitel has a hot new product for you – and it's affordable!

POWER Take advantage of our professional call-handling features. The result – better service for your clients and better use of your resources.

EASY Easy to install, easy to use, easy to train. We put a lot of effort into making the SX-200 LIGHT as easy to use as a telephone.

FLEX It's also easy to upgrade. The SX-200 LIGHT will change with you. Add lines, add new applications, or exploit new opportunities.

HAPPY Mitel customers seem to appreciate our incredibly high quality standards and our prompt (if rarely needed) service. In fact, we've just been rated #1 in overall customer satisfaction* – again.

CALL You're gonna love our attitude towards your business! Call the Mitel Elite Dealer nearest you, or call us.

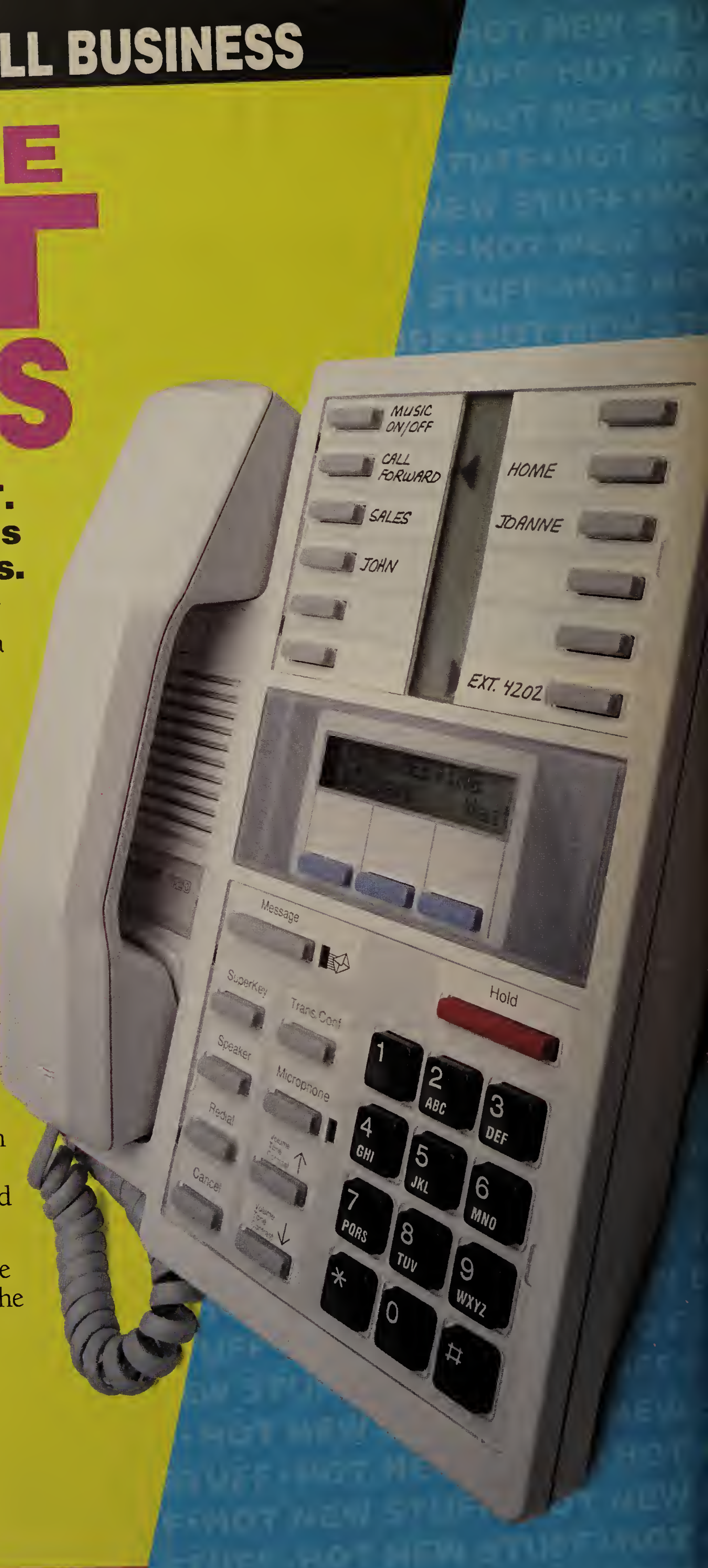
1-800-MITEL-SX

MITEL™

The Right Attitude

M MITEL (design) and SX-200 are trademarks of Mitel Corporation.

*DATAQUEST INC. (a Dun and Bradstreet Company), Score Report: Customer Satisfaction – PBX Systems; November 1991



INTERNETWORKS

LAN-TO-LAN AND LAN-TO-WAN EQUIPMENT AND STRATEGIES

Worth Noting

"The rush toward an enterprise-wide [LAN and WAN] solution means that mux, LAN, router and PBX vendors will now be competing beyond their traditional boundaries against one another."

Fred McClimans
Product manager of
LAN/WAN products
Newbridge Networks, Inc.
Herndon, Va.

Link Notes

Cisco Systems, Inc. and Tokyo-based **NEC Corp.** last week announced an OEM agreement wherein NEC will private-label and resell Cisco's complete internetworking product line. Effective immediately, Cisco's products — including the IGS, CGS, MGS, and AGS+ multiprotocol routers — will become part of NEC's C&C product family.

Chipcom Corp. and **Remedy Corp.** last week announced an agreement wherein Chipcom will resell Remedy's Action Request System software through the Chipcom value-added reseller distribution channel.

Action Request System is an application for tracking net trouble tickets and support requests that works with SunConnect's SunNet Manager and other Simple Network Management Protocol-based net management systems.

The announcement comes on the heels of Chipcom's introduction of an SNMP-based hub management system, ON-demand Network Control System, which runs on top of Sun-

(continued on page 16)

Zenith to upgrade mgmt., offer new modules for hub

Expanded Ethernet and LocalTalk support on tap.

By Joanne Cummings
Staff Writer

GLENVIEW, Ill. — Zenith Communications Products this week is expected to unveil enhancements to its Enterprise Exchange third-generation hub aimed at widening its connectivity and manageability.

The enhancements include a new version of Zenith's Simple Network Management Protocol-based hub management system, as well as a new Ethernet terminal server module and an Apple Computer, Inc. LocalTalk module.

The more powerful management system and expanded Ethernet and LocalTalk support will offer Enterprise Exchange users more reliability and flexibility, according to Edward Zylka, Zenith's director of marketing.

Like the previous version, Enterprise Network Manager (ENM) 2.02 uses the Open Software Foundation, Inc.'s Motif graphical user interface. The new version, however, has been enhanced to run on a Sun Microsystems, Inc. SPARCstation under the SunOS operating system, whereas earlier versions ran on a personal computer under DOS.

The SPARCstation provides the power to support new features, including an autolearning component that uses SNMP to determine the location of each Zenith hub on the network and the number of active modules. When a hub module is removed or becomes inactive, the graphical representation of the module disappears from the management screen.

In addition, the new version now offers a network map showing all the hubs in a user's net. Prior to this, the software showed only one hub.

Version 2.02 can monitor only Ethernet hub modules, but Zylka said the next release, Version 2.04, will offer inband token-ring monitoring and an interface to IBM's NetView integrated network management system.

(continued on page 16)

Firm offers manageable E-net hub

By Joanne Cummings
Staff Writer

AMHERST, N.H. — Lancast, Inc. has announced a low-cost, entry-level Ethernet hub that can be easily upgraded to a manageable hub.

The 14-port Hubcast 4392 system is priced at $695 for the unmanaged version and $1,495 for the managed version, making the price per unmanaged port $50 and the price per managed port just over $100. This is about half the cost of offerings from competitors such as Hewlett-Packard Co., according to Lancast.

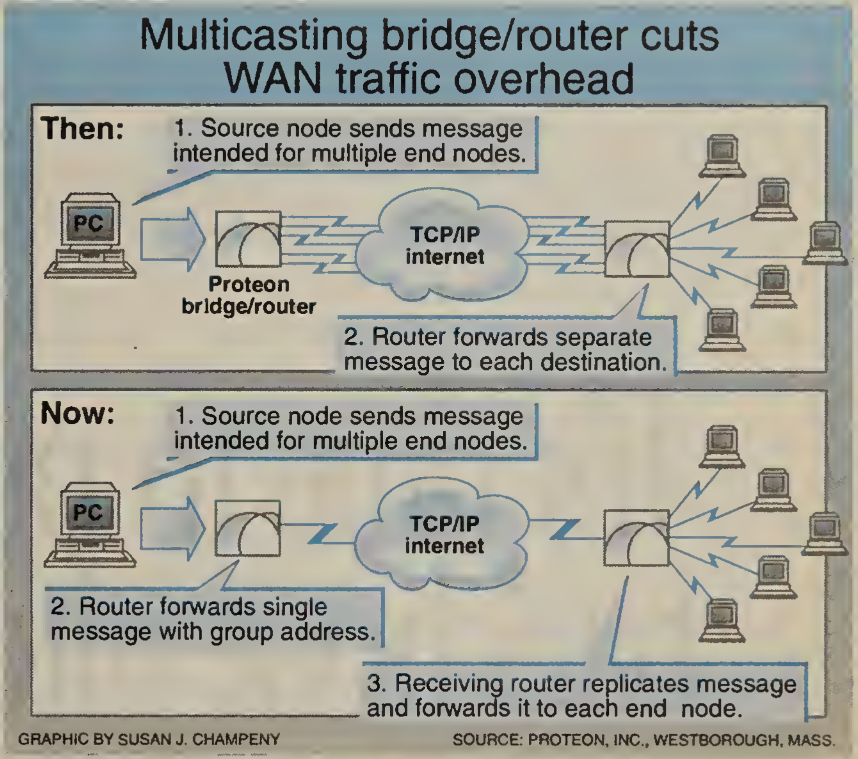
The new hub is a rack-mountable device with 12 unshielded twisted-pair ports, one attachment unit interface (AUI) port and one port that is switch-selectable to support AUI or BNC.

Users can upgrade the device to a managed hub by adding an $800 Simple Network Management Protocol module, which can be managed by any SNMP-compliant management system. The module checks the status of the individual ports in the system and collects system usage statistics.

The hub contains an Intel Corp. 80c188 processor that runs SNMP agent software as well as nonvolatile random-access memory for storing the software and hub configuration. The configuration is saved so that in the event of a power failure, the user does not need to reconfigure the hub and the system can be restarted immediately.

Software for future upgrades can be downloaded locally from one hub to all others or centrally via an out-of-band connection. Users can manage the hub with off-the-shelf SNMP software or purchase a management package from Lancast that runs on a Microsoft Corp. Windows-configured personal computer with an RS-232 communications port.

The Hubcast 4392, which will be demonstrated at INTEROP 92 Spring in Washington, D.C., will be available next month. ▣


Multicasting bridge/router cuts WAN traffic overhead

Then:
1. Source node sends message intended for multiple end nodes.
PC
Proteon bridge/router
TCP/IP internet
2. Router forwards separate message to each destination.
Now:
1. Source node sends message intended for multiple end nodes.
PC
TCP/IP internet
2. Router forwards single message with group address.
3. Receiving router replicates message and forwards it to each end node.

GRAPHIC BY SUSAN J. CHAMPENY

SOURCE: PROTEON, INC., WESTBOROUGH, MASS.

Proteon quiets WAN broadcast storms

New software feature allows bridge/routers to transmit multiple messages as one across nets.

By Maureen Molloy
Staff Writer

WESTBOROUGH, Mass. — Proteon, Inc. last week unveiled a new software feature that reduces broadcast storms and associated overhead traffic on costly wide-area network links.

Proteon's Internet Multicasting software features a group addressing scheme that enables bridge/routers to send a single broadcast message to a remote router, which replicates the message and delivers it to the appropriate end nodes.

This saves backbone bandwidth by eliminating the need to individually transmit packets to each node on the remote local-area network.

"WAN links are expensive, so this new method of conserving bandwidth will be a welcome addition, especially for users with large internetworks," said Charlie Robbins, director of communications research at Aberdeen Group, Inc., a Boston-based consultancy.

The new feature is part of Release 12 of the software for Proteon's line of bridge/routers ("Proteon software upgrade allows universal bridging," *NW,* March 30, 1992).

Cutting traffic, overhead

In operation, Internet Multicasting allows traffic from applications such as electronic mail to be broadcast to a remote site over a source-routed WAN via a single Transmission Control Protocol/Internet Protocol packet.

By reducing the amount of WAN traffic, the software frees up backbone bandwidth and could, theoretically, allow users to eliminate parallel leased lines to some sites.

The Internet Multicasting feature can also be used to reduce overhead associated with the source route bridging algorithm and IBM's Network Basic I/O System by encapsulating both in TCP/IP packets and employing the multicast feature.

NETBIOS broadcast storms are particularly troublesome on low-speed wide-area links, where they can slow communications and drive up network costs.

The new software is an extension to Proteon's version of the Open Shortest Path First (OSPF) routing algorithm. According to John Moy, software architect for internetworking products at Proteon, the vendor is the first to implement this feature in its OSPF offering.

While OSPF provides routers with an addresses database of the entire network, the multicast extension goes one step further by enabling the routers to pinpoint devices that are members of a

(continued on page 16)

Link Notes

continued from page 15

Net Manager ("New Chipcom tools help ONline hub manage itself," *NW*, March 30). The software is scheduled for May availability via Chipcom resellers.

Ungermann-Bass, Inc. last week announced a program that will enable users to trade in any vendor's net management product in order to buy Ungermann-Bass' NetDirector net management system.

Under the program, called Simple As 1-2-3, users that trade in any net manager will receive a credit toward the purchase of NetDirector. The company will accept as many as three net management system trade-ins, for a maximum $6,000 credit. NetDirector currently sells for $8,000 to $19,500, depending on configuration.

Interphase Corp. last week unveiled a Fiber Distributed Data Interface hub that supports a mixture of copper and fiber media and features hot-swappable modules.

The fiberHUB 1600 is a stand-alone eight-port device that can be configured to support as many as 16 ports by adding modules in two-port increments. Individual modules can be removed and inserted while the hub is powered up without affecting performance, according to the firm.

The new hub supports FDDI optical fiber, as well as shielded and unshielded twisted-pair wiring. It is also compatible with the ANSI X3T9 FDDI standard, supports Station Management 6.2 for FDDI management and has a Simple Network Management Protocol agent.

Available in July, the hub costs $13,995 for an eight-port configuration. ☑

Zenith to offer new modules for hub

continued from page 15

He added that the company is looking to port ENM to an open platform, such as Digital Equipment Corp.'s DEC Management Control Center Director, Hewlett-Packard Co.'s OpenView or SunConnect's SunNet Manager. He declined to offer a time frame for the enhancements.

Available by the end of May, ENM Version 2.02 is priced at $5,995.

Zenith is also planning to unveil a new Ethernet terminal server module. The Enterprise Exchange-Ethernet Terminal Server (EE-ETS) module is a 16-port card that connects into one of the hub's four Ethernet backplanes.

It can support Local Area Transport (LAT) and the Transmission Control Protocol/Internet Protocol and has RS-423 and RS-232 connections for linking with twisted-pair Ethernet cabling. It contains an SNMP agent and can be managed by ENM or any SNMP-based management system.

Also available by the end of next month, the EE-ETS module comes in two versions. One supports only TCP/IP and costs $3,995, while a module supporting both TCP/IP and LAT is priced at $4,395.

Zenith is also planning to unveil its first LocalTalk module for the Enterprise Exchange. The Enterprise Exchange-LocalTalk (EE-LT) module is an eight-port card that connects Apple Macintosh computers and peripherals to the hub. Each hub can support as many as 16 modules, for a total of 128 nodes, which can be located as far as 1 km away.

Like the terminal server module, EE-LT has an SNMP agent and can be managed by ENM or any SNMP system. It is priced at $795 and is expected to be available by the end of next month. ☑

Proteon quiets WAN broadcast storms

continued from page 15

particular group. A router will replicate a packet only if one of the attached end nodes is part of the group address.

Moy said workstations and personal computers can be equipped with Internet Group Management Protocol (IGMP) software, which lets a device alert a router that it wants to become a member of a certain group on the network.

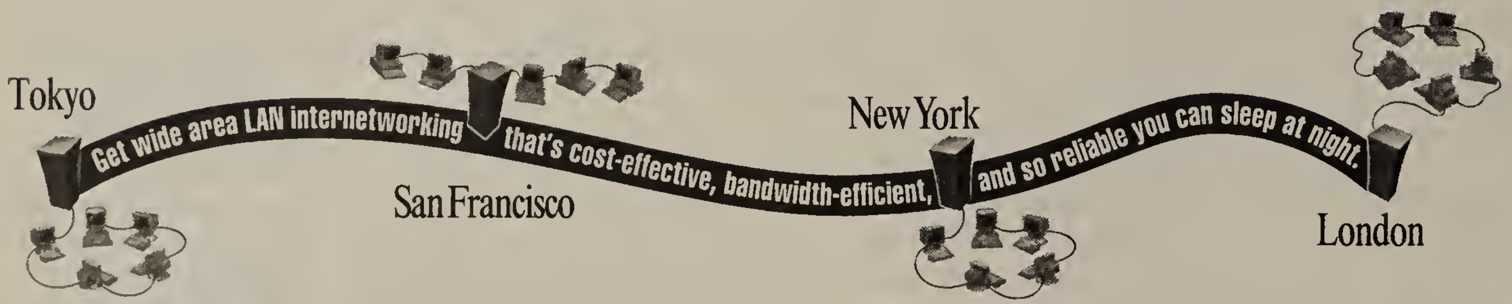
The IGMP software has not been widely implemented to date, he said, but will become increasingly popular as more vendors support such group addressing features.

The multicast feature will also become more useful as users deploy additional distributed applications, such as distributed database management or distributed stock quotes.

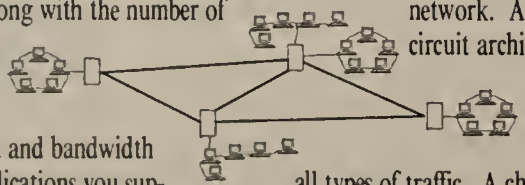
In a stock trading company, for instance, a workstation that generates stock quotes will be able to send single copies of stock information over the WAN. Routers at the remote sites would then replicate the data and transmit it to all the individual trader's workstations.

The new feature will be available next month and will be offered as a free software upgrade. ☑

It's time to put some real backbone into your LAN internetworking.


Tokyo
Get wide area LAN internetworking
San Francisco
that's cost-effective, bandwidth-efficient,
New York
and so reliable you can sleep at night.
London

Introducing the LAN/WAN Exchange.



If you're among the many organizations adopting distributed computing, you may have also discovered that internetworking problems can multiply right along with the number of LANs. The more traffic you have, the more you need to control equipment and bandwidth costs. The more applications you support, the more critical your network availability becomes. In short, the more LANs you connect, the more you need to build an enterprise backbone with the LAN/WAN Exchange™ from N.E.T.

The LAN/WAN Exchange fits right into any IDNX® Communications Resource Manager to give your LAN internetwork all the features you expect from the best multiprotocol router and all the performance and control you get from the best wide area network. An integrated packet–circuit architecture provides the most optimal bandwidth utilization and performance for all types of traffic. A choice of access control facilities gives you better management for time-sensitive traffic.

Integrate your multiprotocol LAN traffic with voice, video, image, facsimile and data traffic for greater economies in equipment, bandwidth and network management. You also get faster rerouting and the reliability of a fully redundant IDNX network. Consolidate management of multiple networks, for extended visibility from wide area all the way to LAN connections.

Find out more about the advantages of integrating LAN internetworking into your enterprise backbone. Get our free information packet on LAN internetworking.

Call 1-800-551-6610. Ask for dept. N1H.

Architecture for the world's most demanding networks.™

N.E.T.
NETWORK
EQUIPMENT TECHNOLOGIES

©1991, Network Equipment Technologies, Inc., 800 Saginaw Drive, Redwood City, CA 94063. (415)366-4400. TLX 172325. United Kingdom: Network Equipment Technologies, Ltd, Manor Court, Manor Royal, Crawley, West Sussex, RH102PY England, (+44) 293-612648. France: Network Equipment Technologies S.A., Parc des Reflets, 165 Avenue du Bois de la Pie, Batiment B, 95912 Roissy CDG Cedex, France (+33) 1 48 63 16 16. N.E.T., Network Equipment Technologies, LAN/WAN Exchange, Architecture for the world's most demanding networks, and the N.E.T. logo are trademarks, and IDNX is a registered trademark of Network Equipment Technologies, Inc. All other registered and unregistered trademarks are the sole property of their respective companies.

GLOBAL SERVICES

DOMESTIC AND INTERNATIONAL VOICE/DATA SERVICES, ACCESS EQUIPMENT AND REGULATORY ISSUES

Worth Noting

According to the North American Telecommunications Association, the 1991 average retail price of an installed 250-line private branch exchange was $114,700, while a 500-line PBX cost $250,000 and a 1,000-line PBX cost $450,000.

Regulatory Update

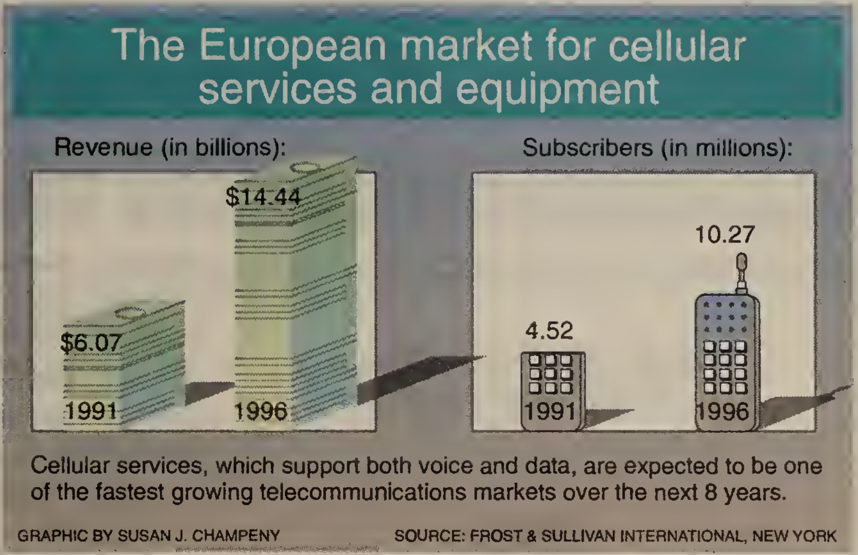
Nynex Corp. began standing trial last week on charges that it violated the business restriction on information services in the Modified Final Judgment during 1986 and 1987. The Department of Justice issued an indictment against the carrier in 1990 after a two-year grand jury investigation into the activities of a Nynex subsidiary, Telco Research Corp.

The Justice Department said Telco Research, a software and information firm in Nashville, allowed MCI Communications Corp. to access, process and store network design information in Telco Research's computers. The department alleges that action violated the Modified Final Judgment ban on information services.

Long-distance carriers added 12% more fiber cable to their networks last year, according to a report released by the **Federal Communications Commission.**

At the end of 1991, AT&T had 36,871 route miles of fiber in its network, followed by 22,725 for Sprint Corp. and 19,793 for MCI Communications Corp. At the end of 1990, AT&T had 32,398 route miles of fiber, Sprint had 22,093

(continued on page 18)



The European market for cellular services and equipment

Cellular services, which support both voice and data, are expected to be one of the fastest growing telecommunications markets over the next 8 years.

GRAPHIC BY SUSAN J. CHAMPENY

SOURCE: FROST & SULLIVAN INTERNATIONAL, NEW YORK

Users stew over carrier reregulation controversy

Warn of trouble if FCC reverses nondominant rules.

By Anita Taff
Washington Bureau Chief

WASHINGTON, D.C. — Users have urged the FCC not to force nondominant carriers to file tariffs, saying such a change would cause nothing but trouble for customers.

At the prodding of AT&T, the Federal Communications Commission is considering reregulating most long-distance carriers. AT&T claims current rules exempting its rivals from filing tariffs are unfair, and it has been trying since 1989 to change the rules using a variety of maneuvers at the FCC.

AT&T's complaints strike at the heart of some of the most important regulatory decisions of the last decade and could fundamentally alter the way users purchase network deals. If AT&T is successful, its rivals will have to file tariffs for all services, including custom network deals, which are currently negotiated through contracts.

Users and rival vendors said in filings last week said that forcing nondominant carriers to file tariffs for custom net deals would be wasteful and could hinder carriers' ability to compete. They warned that such a change could drive up prices, narrow service choices and limit the flexibility of carriers to respond to users' needs.

AT&T filed complaints with the FCC in 1989 against MCI Communications Corp. and in 1990 against Sprint Corp., alleging that their contract-based custom network offerings were illegal. AT&T said the rival carriers had acted improperly in winning custom net deals with such customers as Merrill Lynch & Company, Inc., PepsiCo, Inc. and United Air Lines, Inc.

AT&T's contends the FCC overstepped its authority by lifting tariff filing requirements for smaller carriers — a core principle of the Communications Act of 1934. Also at question is whether nondominant carriers who voluntarily file tariffs can ever deviate from those tariffs with contract-based deals.

In its filing, the International Communications Association (ICA) told the FCC that its members, who spend about $21 billion annually on telecommunications, have enjoyed a wider array of service options, better service quality and more stable prices because of the competition spurred by current tariff rules.

> Reimposing tariff rules on nondominant carriers could damage competition, ICA said.
>
> ▲▲▲

Reimposing tariff rules on nondominant carriers could damage competition and kill those benefits, ICA said, adding that the FCC was well within its authority to exempt some carriers from filing tariffs.

IBM and First Financial Management Corp., an information

(continued on page 18)

Frame relay faces national boundaries

Limited availability, lack of features hinder user plans to deploy the technology on a global basis.

Second in a two-part series examining public frame relay services.

By David Yuen and Bob Reinhold
Special to Network World

Public frame relay services have been increasingly recognized by global corporations as a significant wide-area networking technology for the '90s.

The potential cost savings and higher bandwidth/performance of these services have created a market that analysts predict will generate an annual revenue of about $1 billion by 1995.

Until then, however, organizations seeking to implement global frame relay networks must overcome a number of hurdles, including limited service availability, lack of a gateway standard for linking frame relay nets and lack of support for switched virtual circuits.

Global frame relay networks are constrained by the limited worldwide availability of the services.

While frame relay is maturing in the U.S., as evidenced by increasing deployment, the service is only available in major metropolitan areas. And, on the international front, frame relay is offered only in a few cities in Europe and Japan.

Part of the complication for carriers deploying frame relay services outside the U.S. can be attributed to the lack of reliable transmission facilities, such as fiber, outside major foreign metropolitan areas.

Users may still get public frame relay service to their remote locations on a customized basis, but the prohibitive costs as-

(continued on page 18)

Sprint Data adds locations to value-added data net

By Bob Wallace
Senior Editor

WASHINGTON, D.C. — Sprint Data Group recently expanded the international reach of its SprintNet value-added data network to serve local access and dial-up service in 22 more cities in nine countries.

Sprint Data also announced X.75 connectivity for dial-up and dedicated packet-switched data communications between the U.S. and Sri Lanka.

The new SprintNet access centers are Vienna, Austria; Copenhagen, Denmark; Dublin, Ireland; Edinburgh, Scotland; and the Swedish cities of Malmo, Norrkoping, Stockholm, Sundsvall and Vasteras. Others include Kuwait City, Kuwait; Chiaya and Hsinchu, Tawain; and Kaohsiung, Taichung and Tainan, China.

SprintNet will now serve 108 countries and principalities.

Access in Sweden is provided through Tele2, the new Swedish telecommunications public service provider, while access in Kuwait City is provided through Gulfnet, Sprint's Middle Eastern distributor.

Additional dial-up access to SprintNet is also now available in Hanover, Hamburg and Munich, Germany, and in Montreal, Toronto and Vancouver.

Accessing SprintNet

Access to SprintNet in Germany is provided through INFO AG, a service provider. Both Tele2 and INFO run networks based on Sprint Data's TP4900 packet switches, which are based on 32-bit microprocessors.

Paolo Guidi, president of Sprint International, said SprintNet provides service through more than 500 local access center and X.75 connectivity to packet networks around the world.

SprintNet offers near error-free transmission to most major business centers. The network provides intelligent switching and automated rerouting between network locations worldwide.

Frame relay faces national boundaries

continued from page 17

sociated with foreign carriers pulling fiber to these locations will certainly be charged back to the user.

Gateway standards

The current lack of a standard Network-to-Network Interface (NNI) also limits multinationals in developing global, enterprisewide data networks using a single public frame relay service.

Unlike X.25, frame relay networks use different trunking protocols and lack the ability to interoperate.

There is, however, an increasing requirement for a standard NNI — the equivalent of an X.75 gateway in the X.25 world — in today's increasingly global environment. For instance, the lack of interoperability between WilTel's WilPak service and BT North America, Inc.'s ExpressLane service may cause potential users to reexamine the role of frame relay service in their global networking strategy.

Another impediment to frame relay services becoming a ubiquitous network solution is the lack of switched virtual circuits (SVC). Frame relay networks are currently engineered to support only permanent virtual circuits.

In other words, users must define end-to-end traffic routes before implementing networks. As a result, users must formulate a separate networking strategy to support dial-up traffic. The lost opportunity in the dial-up world is tremendous.

Fortunately, ANSI's T1S1 committee and the Consultative Committee on International Telephony and Telegraphy are working to include SVC definitions for use in frame relay standards. It is now a challenge to the public frame relay service providers to incorporate SVC support in a timely manner.

For public frame relay service to be considered a true global, any-to-any networking solution, service providers must address these obstacles. ◘

Yuen is a senior consultant and Reinhold is a senior manager with Ernst & Young, a consulting and research firm in Vienna, Va.

Users stew over reregulation debate

continued from page 17

services provider based in Atlanta, also supported the FCC's decision to lift tariff filing requirements. IBM said numerous court cases and recent congressional actions indicate that the FCC has the authority to adapt regulation to meet new market conditions. The Ad Hoc Telecommunications Users Committee agreed and pointed out that Congress, which oversees the FCC, has acquiesced to the removal of tariff filing requirements for certain carriers.

"Congress was well aware that the commission had forborne from regulating nondominant carriers and, quite plainly, saw nothing unlawful or even doubtful about [it]," the committee said in its filing.

According to the committee, the FCC should not only uphold its earlier tariffing decision but go further. "The commission should clarify that while [nondominant] carriers can elect to file tariffs for generic services . . . they do not forfeit the right to engage in individualized transactions under contract," the group said.

The Tele-Communications Association, Inc. sounded an ominous warning that users would be vulnerable to changes in their custom network deals if carriers are forced to file tariffs again because tariff provisions supersede contracts. ◘

Regulatory Update

continued from page 17

and MCI had 17,600.

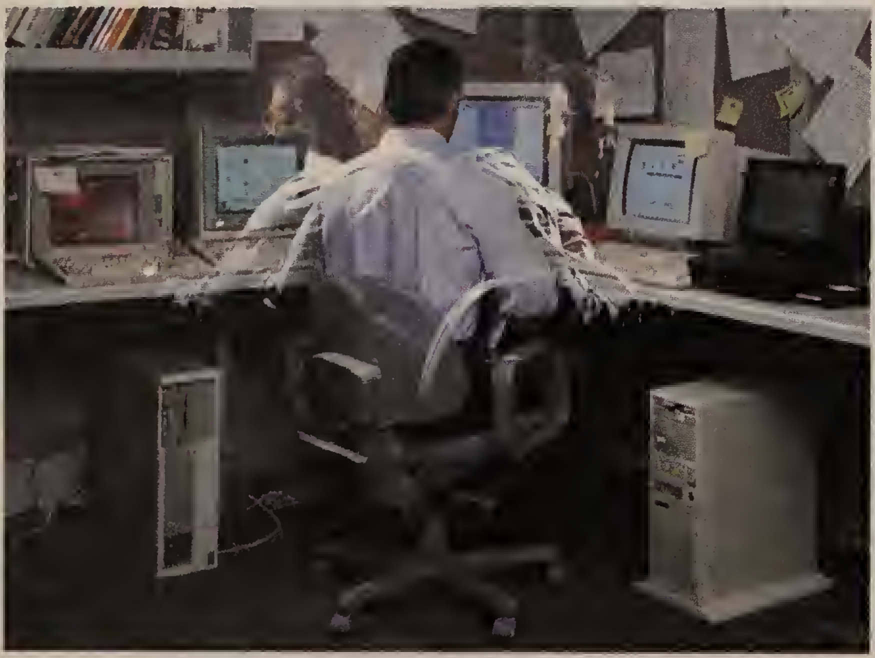
The regional Bell holding companies installed about three times as much fiber in their networks during 1991 compared to 1990. The FCC report shows that, as a whole, the RBHCs increased the fiber facilities in their nets by about 38% last year.

BellSouth Corp. was the industry leader, with 28,512 miles of fiber in its net. Following in second place was US West, Inc., with 22,148 miles. Pacific Telesis Group had the least amount of fiber in its net, with 7,024 miles.

GTE Telephone Co. lead the major independent local telephone companies with 17,596 miles of fiber.

The FCC report also showed that Metropolitan Fiber Systems, Inc. (MFS), a provider of interstate access and private-line services, edged out its main rival, Teleport Communications Group, Inc., for the highest number of fiber route miles. At the end of last year, MFS and its new acquisition, Institutional Communications Co., had 470.5 route miles of fiber, compared to 400.8 for Teleport. ◘

You can monitor five standalone network systems...



Or one Lance+.

You heard right. A single Lance+ system can integrate all the functionality of those individual monitors into one system *while maintaining the same level of device management each standalone provides.* And that includes products from Cisco. ODS, Wellfleet, SynOptics, Cabletron, Novell and others.

Lance+ is a seamless solution that gives you total command and control. It combines a global overview with local support all the way to the subnet level, so you can manage from the top down *and* from the bottom up.

With Lance+ you can:

☐ Maximize the management capabilities of each hub, router, bridge, etc.
☐ Correlate and isolate *all* alarms
☐ Centralize network management support with one vendor
☐ And simplify training because you learn one interface, not five different packages

In normal day-to-day operation, Lance+ provides the mapping, data base and reports you need to increase network efficiency, maximize availability and support long term planning and trend analysis.

Plus, during a network crisis, Lance+ has an Event Management feature that can correlate alarms, trigger remedial applications and log a complete event record for future analysis.

Standalones? They just don't stand up to the integrated capabilities of a flexible and extensible Lance+ system.

For more information or an on-line demo, call (800) 92-LANCE.

LEXCEL™
A Micro Technology Company

2600 E. Nutwood Ave., Suite 800, Fullerton, CA 92631
(714) 680-0100 or (800) 92-LANCE.
European Headquarters: Carl-Zeiss-Ring 5, D-8045
Ismaning, Germany Tel 49-89-9607050 Fax 49-89-9612636

Lance+ and Lexcel are trademarks of Micro Technology. All other product and company names are the property of their respective holders. © 1992 Lexcel

FAX FOR FACTS

Discover How Our Diversi-T Access Mux Can Make Switched Services Work For You.

If you're looking to get the most out of today's switched digital network services, look to Larse. Our modular Diversi-T™ network access multiplexer lets you choose the most cost-effective combination of public switched and dedicated services to meet your specific communications needs and budget.

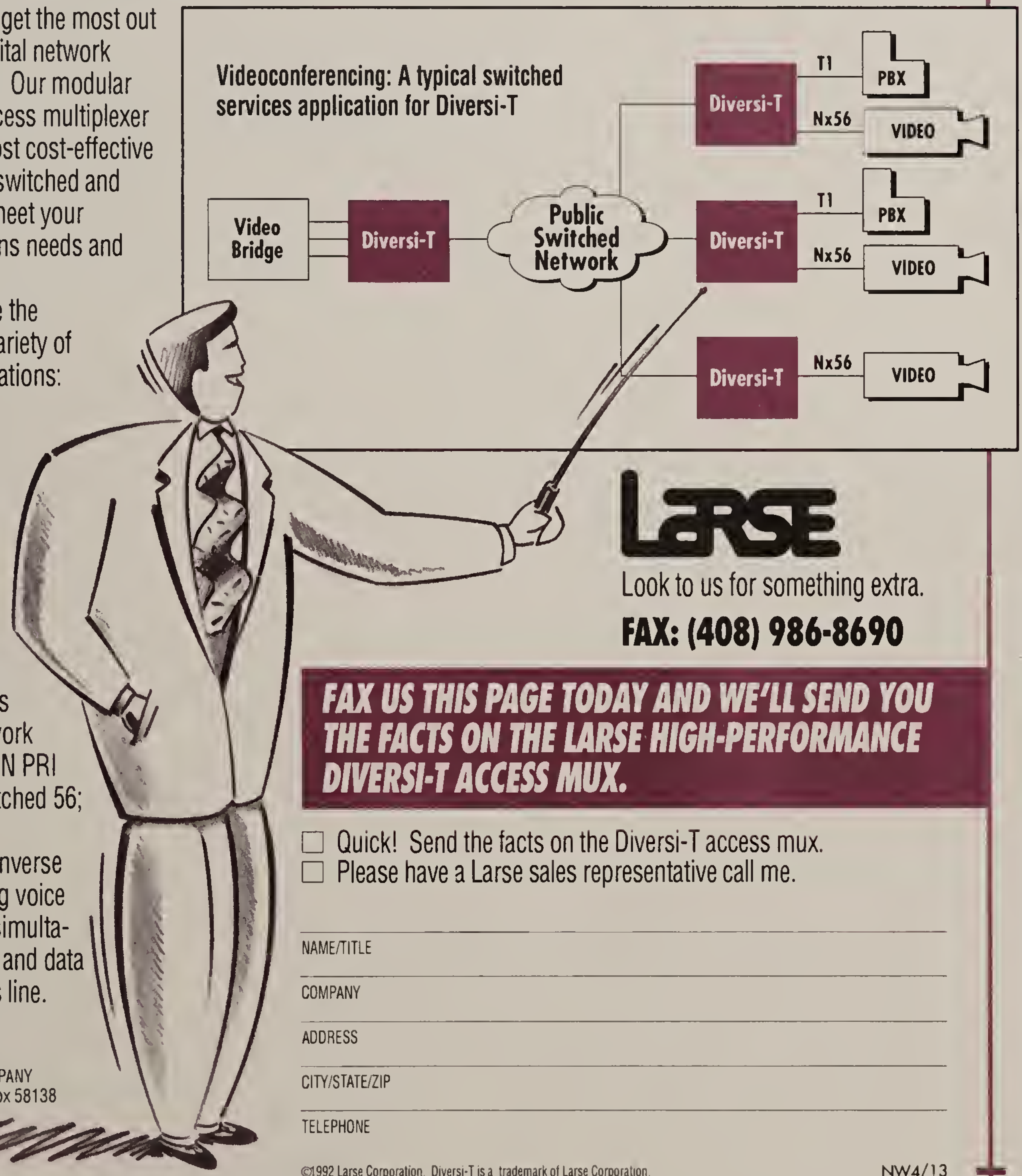
Fact is, you can use the flexible Diversi-T in a variety of high-speed data applications:

- Videoconferencing.
- LAN interconnection.
- Peak traffic overflow and disaster recovery.
- And much more.

Diversi-T provides fast, economical access to a wide range of network services, including ISDN PRI 64/384/1536 kbps; switched 56; and fractional T1.

Plus, our optional inverse multiplexing and analog voice modules allow you to simultaneously transmit voice and data over a single T1 access line.

Larse Corporation
AN AXEL JOHNSON INC. COMPANY
4600 Patrick Henry Drive, P.O. Box 58138
Santa Clara, CA 95052-8138
Phone: (408) 988-6600
FAX: (408) 986-8690



Videoconferencing: A typical switched services application for Diversi-T

LARSE

Look to us for something extra.

FAX: (408) 986-8690

FAX US THIS PAGE TODAY AND WE'LL SEND YOU THE FACTS ON THE LARSE HIGH-PERFORMANCE DIVERSI-T ACCESS MUX.

☐ Quick! Send the facts on the Diversi-T access mux.
☐ Please have a Larse sales representative call me.

NAME/TITLE

COMPANY

ADDRESS

CITY/STATE/ZIP

TELEPHONE

©1992 Larse Corporation. Diversi-T is a trademark of Larse Corporation.

NW4/13

ENTERPRISE APPLICATIONS

CLIENT/SERVER AND ENABLING SOFTWARE: DISTRIBUTED DATABASE, MESSAGING, GROUPWARE AND IMAGING

Worth Noting

"The move to client/server computing will be the most massive retraining effort the industry has ever known."

David Litwack
President
Powersoft Corp.
Burlington, Mass.

Store & Forward

Oracle Corp. last week announced a new 32-bit implementation of its Oracle Server for OS/2 that is targeted at users of IBM's newly released OS/2 Version 2.0.

Called Oracle Server for OS/2 Version 2.0, the release is optimized for the enhanced version of OS/2, supports up to 4G bytes of main memory, provides better performance for transaction processing and allows as many as 100 users to be supported in large configurations.

The product also includes an improved data loader, SQL*Loader, which includes a so-called fast-load feature that accommodates the loading and periodic refreshing demands of larger databases.

Oracle Server for OS/2 includes SQL*Net networking support for both Novell, Inc. NetWare and IBM LAN Server local-area networks.

The new version supports nine European languages in addition to English. The product provides status and error messages in Danish, Dutch, Finnish, French, German, Italian, Norwegian, Spanish and Swedish.

Oracle Server for OS/2 Version 2.0 is expected to be available in May.

Pricing starts at $3,999 for eight users. That figure increases depending on configuration. ◪

GeneSys extends imaging to DOS-based applications

Client/server software provides access to images.

By Ellen Messmer
Washington Correspondent

HUNT VALLEY, Md. — GeneSys Data Technologies, Inc. has introduced ImageExtender, client/server-based imaging software that gives existing MS-DOS applications the ability to access scanned images.

The client portion of ImageExtender works with any MS-DOS word processing or database application and enables an end user to append image files to a document through "hot keys" configured for imaging functions.

The server portion of ImageExtender requires a dedicated OS/2 machine, which drives an optical disk jukebox housing erasable or nonerasable disks on which scanned images are stored.

Pat Ward, vice-president of GeneSys, said ImageExtender can be integrated into a user's existing local-area network environment, eliminating the need for a separate imaging network. He added that ImageExtender has been tested to work with major network operating systems, including Banyan Systems, Inc.'s VINES, Digital Equipment Corp.'s Pathworks, Microsoft Corp.'s LAN Manager and Novell, Inc.'s NetWare.

> The server portion of ImageExtender requires a dedicated OS/2 machine.
>
> ▲▲▲

ImageExtender enables a user to append a jukebox-stored image document to a specific portion of a personal computer application file for future reference when needed. Scott Nichol, software engineer at the Hunt Valley, Md.-based software firm, said ImageExtender has a screen-capture feature that cross-references the portion of the document displayed to the imaging files associated with it.

The server portion maintains this information, and when a user calls up a file and hits the preprogrammed ALT D display key to retrieve the image, the server retrieves the image and transfers it to the user's workstation.

According to Nichol, ImageExtender uses a split-screen transfer to display the application document on one side and the imaging files on the other. The company plans to introduce a Microsoft Windows-based version of ImageExtender in June.

> ImageExtender enables a user to append a jukebox-stored image document.
>
> ▲▲▲

Analysts said ImageExtender offers the benefits of imaging to MS-DOS applications without special programming but noted that the product has some rough edges.

Carl Frappaolo, a consultant with Boston-based Delphi Consulting Group, Inc., which specializes in electronic document imaging systems, said ImageExtender can only assign an image to an application file while the document is being scanned. However, an image cannot be assigned to another file unless the document is rescanned.

ImageExtender lacks the ability to leave an electronic notation on a document that notifies the user that a scanned image is associated with it, he added. According to Nichol, this was not included because of memory concerns.

GeneSys is pricing ImageExtender starting at $2,995, which provides software for an unlimited number of PCs but restricts usage of the software to one user at a time. Support for five simultaneous users would cost $13,500.

Frappaolo called the entry price extemely low and said ImageExtender could benefit small companies wanting to tests the waters of imaging without a major investment.

GeneSys is offering a free trial of the software, which is available now. ◪

"We haven't been asleep for the last two or three years. After the dust settles with [Oracle Corp.'s] Version 7, we'll begin to talk about our next-generation technology, a lot of which will show up in 1993."

▲▲▲

Stewart Schuster
Vice-president of marketing
Sybase, Inc.

Sybase details plans to keep rivals at bay

Exec lays out future direction of next-generation SQL database, tools and connectivity products.

Q&A While many in the industry view Sybase, Inc. as holding the technology lead in the SQL database server arena, competitors such as Oracle Corp. are ready to introduce new versions of their products that analysts predict will match up fairly closely with Sybase's offerings.

Recently, *Network World* Editor John Gallant and West Coast Bureau Chief Timothy O'Brien spoke with Stewart Schuster, Sybase's vice-president of marketing, who outlined the company's next-generation development plans and explained how these enhancements would keep Sybase well positioned against Oracle.

The Sybase system consists of a client/server SQL database, SQL development tools and connectivity products. The Sybase SQL Server is offered on most leading Unix platforms as well as on OS/2 through a joint agreement with Microsoft Corp.

In a recent story, we laid out most of the new features in Oracle's upcoming Version 7, which they claim will bring their product up to par with yours. What's your view on this?

We've been competing with this claim for 12 months now because they have been talking about Version 7 for at least that long. We address the competition by showing the distributed architecture that is built into our product line. When we line up this capability with Version 7, we are able to compete effectively.

What about when they try to match feature for feature?

Do they or will they have stored procedures? The answer is yes. They claim they will have triggers. What we don't know, since we haven't seen the product, is how robust and complete these features will be.

They are definitely setting their development track according to Sybase's agenda. We set the agenda for them in the last four years regarding servers, especially in terms of [on-line transaction processing] and client/server capabilities. I still think we will be pretty comfortable with our current version against Version 7. But they are closing the gap from that perspective.

Nevertheless, we haven't been asleep for the last two or three years. We've been working on our next-generation technology. After the dust settles with Version 7, we'll begin to talk about our next-generation technology, a lot of which will show up in 1993. That will set the bar up another notch, as one of our strategies is to maintain a technological leadership over Oracle. We think that's important as one of the younger, more innovative companies in the business.

Can you explain some of your development plans?

When you go client/server, it's an inherently distributed environment. What we find is that a lot of the models for distributed

(continued on page 20)

Sybase details server plans

continued from page 19

transaction processing are extremely simplistic, with the standard model being a two-phase commit for coordinating transactions across multiple systems.

We have found that model to be weak in the distributed world because it assumes that the network is always available. And our customers are telling us they need a more general distributed transaction model that would allow time-staged transactions and data to be replicated on the network.

These are the kinds of problems they want us to solve in order to move client/server into a broader enterprise context.

Another area we already have a leg up on is mainframe connectivity for high performance transaction processing. This is not just retrieval-oriented downloading of data and querying, but also the ability to extend transaction processing across the network.

We already have products on the market to do that, which has been the major architectural differentiator between us and Oracle as we connect into the transaction world of the mainframe.

Another area Oracle has spent a lot of time looking at is advanced hardware architectures for very large database applications. We think by using today's symmetric multiprocessing systems and connecting them into loosely coupled networks using fiber optics, you can build the equivalent of these exotic architectures out of standard components.

People have said they want us to build products that allow them to do very high performance, parallel transaction and query processing without going to a new, exotic product. We have technology under development that will solve these problems.

The next major area is in the application productivity business. If you look at [third- and fourth-generation language] environments and the relational world, you'll find they haven't changed a lot for over a decade. Instead of writing COBOL code, you write [fourth-generation language] code.

The CASE environments are not tightly linked in yet with the entire development environment, and application development is done more or less traditionally, replacing [third-generation language] code with [fourth-generation language] code.

The world of distributed computing is adding a new layer of application complexity, which requires a development environment that takes advantage of object-oriented technologies and repository-based systems.

We've been working with a number of customers very closely in this area to raise the bar for application development in a distributed client/server arena. After the server problems are addressed and solved, probably the application productivity area is the most important to be carried through in the '90s.

Are some of the underlying connectivity issues still a factor in gaining access to data in an enterprise network?

A lot of the connectivity and portability has been solved, but what is still difficult is the development, deployment and maintenance of these applications in a distributed environment.

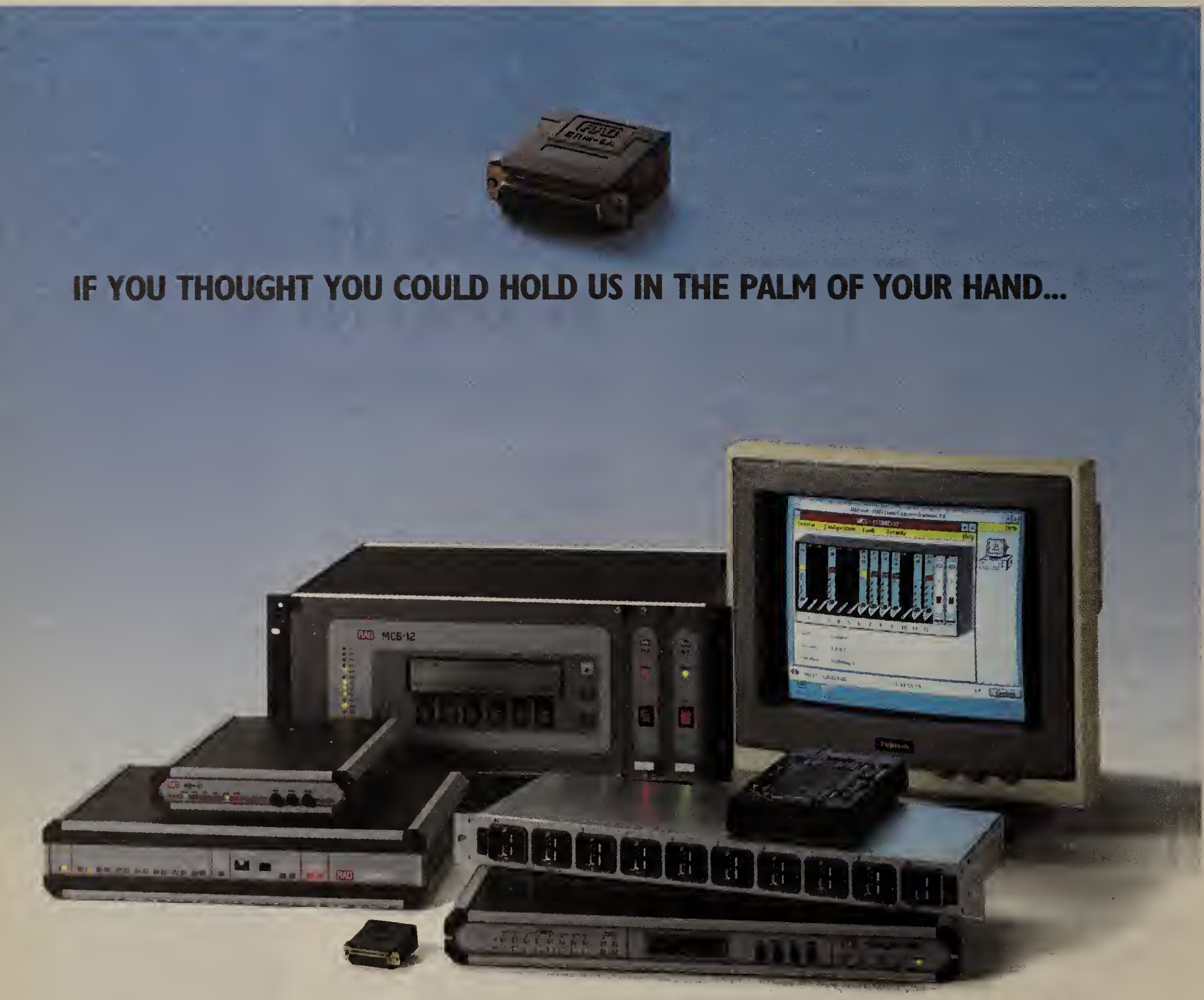
One of the things we have discovered is that when you're in the world of client/server, as opposed to relational database, it is more than just talking relational data.

Actually, relational databases hold a very small percentage of today's data, so much of that data needs to be described as outside of a relational database, like real-time feeds for process control, stock quotes or large text and image files.

You can get that type of data into Sybase now and store it there, but users typically want to include with it semantics and other processing capabilities such as more rich object management capabilities. This means being able to describe the data beyond just the tables, fields and columns in this relational database.

This also means describing how the code is connected and interrelates — whether it has been generated by the system or by programmers — and being able to store that information in a rational way and use it to help evolve the development of appli-

(continued on page 31)


IF YOU THOUGHT YOU COULD HOLD US IN THE PALM OF YOUR HAND...

...THINK AGAIN

Many people think of RAD as the company that makes those tiny modems. It's understandable. After all, we made our name on miniature and subminiature data communications products, and we still think they're the best around.

But there's much more to RAD than miniature modems, multiplexers and converters. We offer a wide range of base-band modems at speeds up to 2 Mbps. Our lines of TDM and statistical multiplexers handle data and voice including T1/CEPT multiplexers and data compressors. More than 30 different converters provide a variety of interfaces and data rates that let your different equipment talk to each other. And we have a full line of Token Ring products including trunk access units, repeaters, fiber optic converters, extenders, testers, and our RADnet Token Ring Management System.

So if you thought small when you thought RAD, maybe you should think again. Or better yet, contact RAD today to receive our latest catalog of small and large data communication products.

RAD

We're not just small talk.

data communications

RAD Data Communications
U.S. East: 900 Corporate Drive, Mahwah, NJ 07430
Tel: (201) 529-1100, Fax: (201) 529-5777
U.S. West: 7711 Center Avenue #600, Huntington Beach, CA 92647
Tel: (714) 891-1964, Fax: (714) 891-7788
International Headquarters
8 Hanechoshet Street, Tel Aviv 69710, Israel
Tel: 972-3-494511, Telex: 371263 RADCO IL, Fax: 972-3-498250

Introducing Z▪NOTE. The future is built in.

320L	325L	325Lc
i386®SL-20 MHz	i386SL-25MHz	
60MB HDD	85 or 120MB	120MB
10.0″ (9.5″ v) VGA black-on-white display upgradeable to active-matrix color		8.4″ VGA color
5.9 lbs.* *incl. nickel metal-hydride battery		6.5 lbs.*
4 hours continuous power, max 10 hours under Z▪NOTE *Premier System Management.*™ Expect about 1/3 less with color.		
ETHERNET NETWORK-READY Novell NetWare, Microsoft LAN Manager, and Banyan VINES client shells		
WINDOWS-READY MS-DOS® 5.0 with APM/Microsoft *Windows* 3.1 Logitech TrackMan Portable Mouse		
UPGRADE OPTIONS Memory, BIOS, HDD, FDD, Co-Processor, Display		

320L *$2599*	325L *$3099* Model 85	325L *$3599* Model 120	325Lc *$5299*

Generations Ahead.

While the others are busy imitating the SL-notebook design we shipped last July, Zenith Data Systems is thinking two generations ahead. Our new Z▪NOTE™ brings a new genius to power management: *over four hours* of non-stop high-performance computing power. And our new "lid rest" feature allows you to close down without shutting down. It's simple, and it's just the beginning.

Notebooks Meet Networks.

The Z▪NOTE introduces notebooks to networking. *Built-in* networking. Believe it. We've put Ethernet on the motherboard. And we've pre-installed client shells for Novell NetWare,® Microsoft® LAN Manager,™ and Banyan® VINES.® Take your pick.

We've Seen The Future And It's In Color.

Our new active-matrix color display is a knockout. And the real beauty of it is that you can start with our high-contrast black-on-white model and upgrade to color in the future. In minutes. It's worth waiting for.

Who Needs A Docking Station?

Just snap on the optional, inexpensive READYDESK™ Port Replicator and you have instant access to all your office peripherals. It's pretty neat. It's Z▪NOTE.

Practice Makes Perfect.

There's no more-thoroughly-thought-out SL notebook on the market. Microsoft Windows™ 3.1 is pre-installed. The Logitech® TrackMan® Portable Mouse is included. LCD/CRT video is simultaneous. And the optional data/fax modem works worldwide. You won't get that kind of thinking from the rookies. It's called Thinking Ahead. And we're used to it.

intel inside

MICROSOFT® WINDOWS.™ READY-TO-RUN

Call 1-800-523-9393.

Reseller prices may vary. But call ahead. We'll tell you how we can guarantee prices on all four models. When you're Thinking Ahead, you think of everything.

Resellers determine their own pricing which may be higher or lower than Zenith Data Systems advertised prices. All prices and specifications are subject to change. Prices are for models shown, in U.S. dollars. Shipping, handling, and applicable sales taxes not included in the price.

Z▪NOTE, READYDESK and *Premier System Management* are trademarks of Zenith Data Systems Corporation. Microsoft, LAN Manager, MS-DOS, *Windows* and the Ready-To-Run logo are trademarks of Microsoft Corporation. Logitech and TrackMan are trademarks of Logitech, Inc. The Intel Inside logo and i386 are trademarks of Intel Corporation. NetWare is a trademark of Novell, Inc. Banyan and VINES are trademarks of Banyan Systems, Inc. Copyright © 1992 Zenith Data Systems Corporation.

ZENITH DATA SYSTEMS

A Bull Company

Thinking Ahead.

$5K

In telecommunications, numbers speak louder than words.

©1992 Hewlett-Packard Company ADCSWG019

35 MIPS

The new HP Apollo Series 700 RISC workstations raise a wide range of applications to a new level of price/performance. In a family offering up to 77 MIPS for less than $21K.

All the leading telecom applications providers run with us. Including ACCUGRAPH; Analogy; ASK/Ingres; Asterix; AT&T; Cadence; Century Analysis; Clarity Software; EDS, GDS; ESRI; Frame; Genasys; Information Builders; Information & Graphics Systems; Informix; INTERGRAPH; Interleaf; ISICAD; Island Graphics; Lotus; MapInfo; Mentor; MJM Software; MPR Teltech; Northern Telecom; Oracle; Price Waterhouse; Prism Systems; Racal Redac; Sybase; Systems Strategies; View Logic; and WordPerfect.

Now that we've got your numbers, call ours. **1-800-637-7740, Ext. 3109.**

HEWLETT PACKARD

MULTI-POINT VIDEO CONFERENCING JUST GOT REINVENTED...

First, **Fracdial** saved you 70% over dedicated networks by letting you dial up high bandwidth video conferences. Now with **Virtual Bridge**, the new **Fracdial** option, you can dial up multi-point video conferences and save an additional 80% in equipment costs! At only $2,500 an installation, **Virtual Bridge**, added to any **Fracdial** model, makes multi-point video conferencing affordable for everyday applications such as distance learning, middle management work sessions, industrial training, and more!

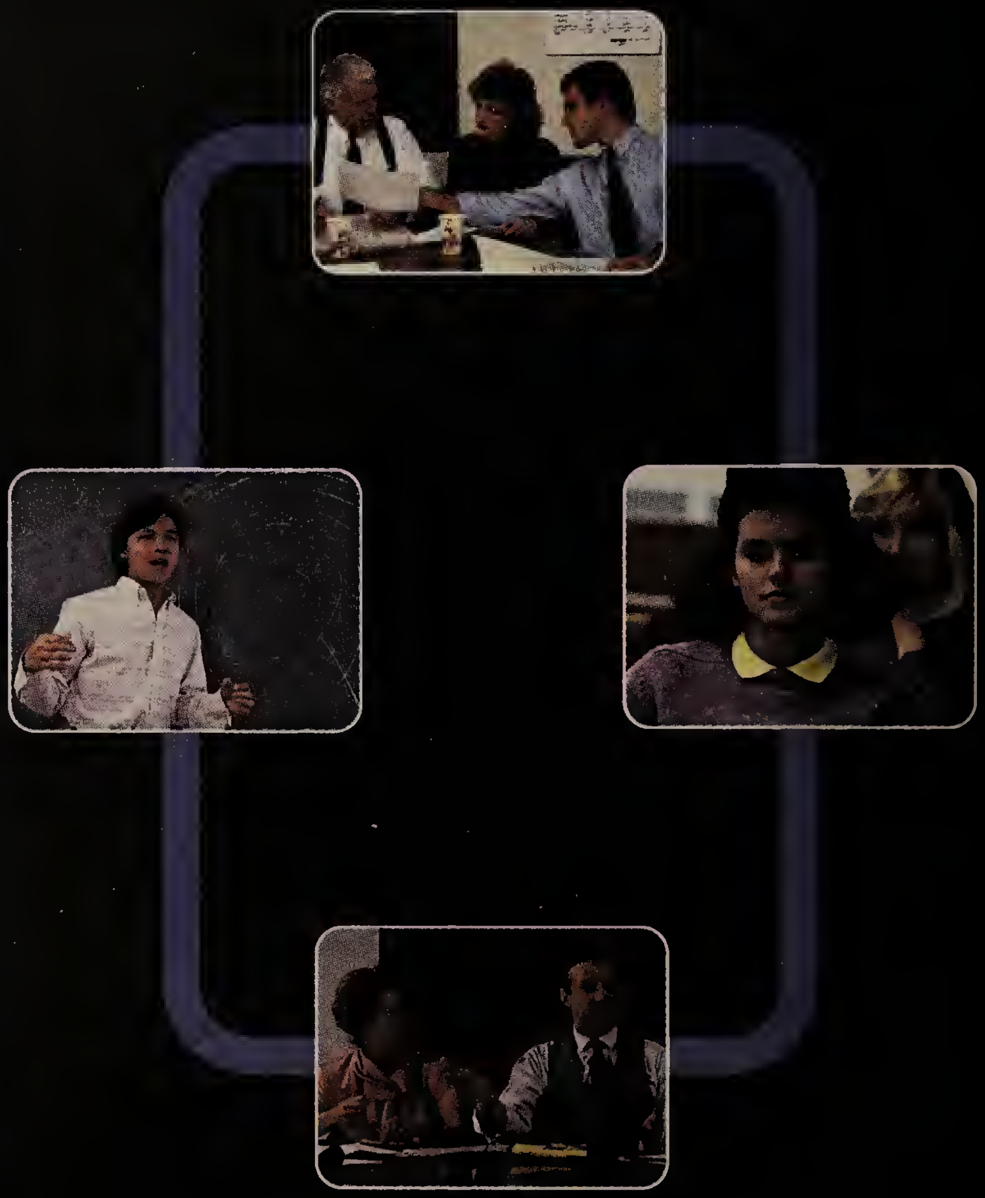
Fracdial™ With Virtual Bridge™

Virtual Bridge works with all video codec makes. It even supports different codecs, using the CCITT H.261 protocol, in a single conference.

What's more, **Virtual Bridge** is as easy to use as a FAX. From a menu, simply select the parties you want in your conference and push a button. It's that easy. You can connect up to 16 sites per conference and have an unlimited number of independent conferences going on simultaneously!

Virtual Bridge is the only way to gain multi-point capability without heavy capital expenditures. And, with **Virtual Bridge** you can buy only the capacity you need. When you need more, its simple and inexpensive to expand. Plus you're in total control of conference scheduling and setup.

Find out how **Fracdial** with **Virtual Bridge** has reinvented video conferencing, and its cost, for you. Call, write, or fax today.



...AND SO DID ITS COST.

IIDIGITAL ACCESS

11501 SUNSET HILLS ROAD, SUITE 200
RESTON, VIRGINIA 22090
*IN VIRGINIA: **(703) 471-5010***
*TOLL FREE: **1-800-666-2325***
*FAX: **(703) 471-4848***

Fracdial™ and Virtual Bridge™ are trademarks of Digital Access Incorporated.

INDUSTRY UPDATE

VENDOR STRATEGIES, MARKET TRENDS, ALLIANCES AND FINANCIALS

Worth Noting

"It's going to be very difficult for IBM to get users to wait for APPN instead of taking the tactical step that's available today, which is to use TCP/IP as a means of handling SNA traffic."

Jim Harrison
Program director
META Group
Westport, Conn.

People & Positions

Novell, Inc. has announced that **Jan Newman,** formerly vice-president of software development, has been appointed executive vice-president and general manager of the company's NetWare Systems Group, effective May 1. This follows the retirement of **James Bills,** the group's manager, who will continue as a consultant.

Also, Novell said **Richard Williams** has retired as head of Novell's Desktop Systems Group. **John Edwards,** formerly vice-president of marketing for the NetWare Systems Group, has been appointed executive vice-president and general manager of the Desktop Systems Group and will oversee development of Novell's desktop operating systems products.

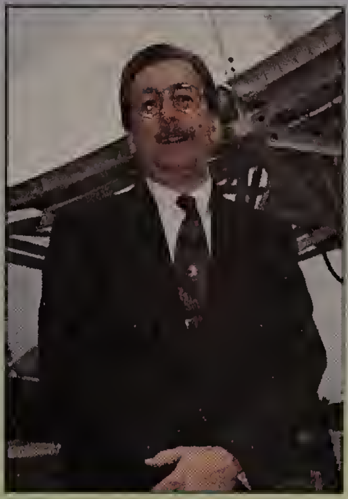
Sprint Corp. has announced that **Robert Cymbala** has been named executive vice-president of corporate development and planning at Sprint.

Formerly president and chief executive officer of Graphic Scanning Corp., Cymbala will assume responsibility for technology planning and business development. He replaces **Dave King,** who has retired.

"This is a business in which you're never quite big enough. The public offering gives us access to additional capital."

▲▲▲

Michael Brinks
Vice-president and general manager
Teleport Denver, Ltd.



Intertel gains listing on American Stock Exchange

First-ever publicly held alternate access carrier.

By Bob Brown
Senior Editor

DENVER — Intertel Communications, Inc., the parent company of Teleport Denver, Ltd., holds the distinction of being the only publicly held alternate access carrier.

The American Stock Exchange (Amex) last month began listing Intertel on its new Emerging Companies Marketplace stock board. The firm is also listed on the Vancouver Stock Exchange, a lower profile board.

According to Bill Becker, president and chairman of Intertel, the carrier's listing on Amex will position the company for future growth. "We plan to build and expand our alternative local communications services to other markets in the Rocky Mountains area," he said.

Michael Brinks, vice-president and general manager at Teleport Denver, said the listing shows that the stock market has confidence not only in Intertel, but also in the emerging alternate access carrier market. This should help customers feel more comfortable about handing over critical network traffic to these carriers and eliminate the perception that they are fly-by-night operations.

"This is a business in which you're never quite big enough," he said. "The public offering gives us access to additional capital."

Teleport Denver, whose stock price has been hovering around $2 per share, is nearing completion of a 115-mile fiber-optic net ring connecting Denver's business district and major area business parks to the long-haul networks of AT&T, MCI Communications Corp. and Sprint Corp.

The carrier, which has been offering services since last May, recently received approval to build a ring in downtown Denver and plans to begin providing service via that net by this summer.

Teleport Denver offers T-3, T-1, fractional T-1 and several other lower speed services. Last month, Teleport Denver unveiled plans to offer international services, as well. The carrier is in the process of buying two 11-meter satellite dishes to provide private-line services to Asia, Europe, and other parts of the world.

The carrier is examining six other cities for expansion and exploring new services.

▲▲▲

The carrier is examining six other cities for possible expansion, Brinks said, and exploring new services, such as local-area network interconnection and switched services.

Bob Atkinson, senior vice-president of regulatory and external affairs at Teleport Communications Group, Inc., a New York-based alternate access provider, said Intertel's ability to become listed on Amex is good news for users and carriers because "it shows that investors may be starting to recognize the value of this industry."

Standards groups fail to create int'l pact

Two standards are better than none, but vendors predict deadlock could drive up development costs.

By Ellen Messmer
Washington Correspondent

WASHINGTON, D.C. — An effort to standardize call management switch-to-computer technology suffered a setback when U.S. and European standards groups failed to reach an agreement on a common standard during a recent meeting in London.

As a result, ANSI and the European Computer Manufacturers Association (ECMA) this summer are expected to issue different standards for transferring call information from phone switches to computers.

According to vendors, dual standards will drive up development costs, but some noted that two standards are better than none in the fledging Computer-Telephone Integration (CTI) industry that is dominated by proprietary switch-to-host application layer protocols.

Carlos Lopez-Abadia, a member of the technical staff at Southwestern Bell Technology Resources, said the London meeting between ANSI and ECMA to try to merge their respective specifications had been unsuccessful.

This summer, therefore, ANSI will release its Switch-to-Computer Application Interface (SCAI) standard at roughly the same time ECMA releases its standard, the Computer-Supported Telephony Application (CSTA).

At a meeting of the trade group Alliance of Computer-based Telephony Application Suppliers here last week, several switch, computer and service vendors reacted with disappointment to Lopez-Abadia's report.

"We'd like to have one interface," said Robert Alley, marketing manager at Hewlett-Packard Co.'s applied computer technology division. "We're implementing multiple interfaces now, and [a single standard] would reduce our development costs and allow for a bigger market."

The standards specify how to link private branch exchanges and automatic call distributors to host computers, making it possible, for example, to route incoming calls and data about the caller to waiting agents.

CTI applications can shave off a quarter of the time required to handle a call, according to Byron Battles, consultant with Rockland, Md.-based The Aries Group/MPSG. But the need for vendors to support multiple protocols has kept costs high. The lack of standards has also sometimes forced companies to clutter their networks with protocol-translation boxes.

Not an easy mix

Differences in SCAI and CSTA raise the question of how easy it will be to merge the two specs. CSTA, developed prior to SCAI by computer makers, favors PBX support. SCAI, which shows Bell operating company and switch vendor influence, is designed as a central office link. SCAI will likely be implmented in new Centrex-based services.

Digital Equipment Corp. and IBM, active in the ECMA TC32-TC11 and ANSI T1S1 standards committees, said there is no technical reason not to merge the two specs.

"Our objective is to have the standards come together," said Barbara McDuffie, product manager at IBM's networking systems division.

A number of vendors, such as DEC and Rolm Corp., have already implemented CSTA. Carl Strathmeyer, director of marketing at DEC's computer integration technology division, said his company last September implemented CSTA for its VAX line first because the ANSI SCAI spec was not finalized.

"The real issue is, when the SCAI is finalized, which central office switch vendors and carriers will support it," he said. Northern Telecom, Inc. plans to add SCAI-based software to its DMS-100 switch, Strathmeyer added.

Lopez-Abadia said it is not yet clear what approach the European post, telegraph and telephone adminstrations will take.

Last week, AT&T clarified its strategy on SCAI. Joe Poe, AT&T product manager for intelligent networks, said the carrier will implement SCAI on its 5ESS switch in the 1994-95 time frame.

Ungermann-Bass is a registered trademark of Ungermann-Bass, Inc. © 1992 Ungermann-Bass, Inc.

You bet it is. In these days of "open" systems, most LAN vendors are still leading customers down dead-end streets. While everyone claims to be "open," most are very "closed." Take routers, for example—carefully protected, incompatible routing algorithms tightly lock users to one vendor. Or network management—where are the industry-standard APIs and truly "open" databases?

Worse still, users are constantly forced to junk their investments. For example, users had to discard their wiring concentrators to get effective network management and broad connectivity from intelligent hubs. Now they are facing the same dilemma in migrating to enterprise hubs that support integrated routing and multimedia. The true cost of obsolescence is astonishingly high.

Enough is enough. LAN users deserve products with smooth migration paths that protect their investment and provide for the future. The LAN industry owes its customers truly open systems. Now. If you want to hear more about our views on these issues, call 1-800-777-4LAN.

Ungermann-Bass

There are 238 ways to manage your health. But only one way to manage an entire network. Your way.

For everyone saying they'll keep you fit and trim, there's a software vendor saying they'll manage your network. But only Systems Center products really let you manage the network you've built—the way you want to.

Our approach is truly peer-based—IBM®, Tandem®, Digital™, AT&T, and Fujitsu®. You make use of the network management tools you already have. And, you control your network from the point that makes sense for you.

Our products automate the routine parts of network management, freeing your staff for more important tasks. At the same time, they'll find our approach is easy to learn, because it's built upon a rule-based, 4th-generation language.

If Systems Center products sound like the edge you need, call 1-800-533-5128 to schedule a presentation, or for more information. As soon as you finish your workout, that is.

WASHINGTON • TORONTO • LONDON • BRUSSELS • PARIS
FRANKFURT • TOKYO • SYDNEY • SINGAPORE • SAO PAULO
©1992 Systems Center, Inc.

SYSTEMS CENTER®

WNWX920413

MANAGEMENT STRATEGIES

ENTERPRISE NETWORK STRATEGIES, USER GROUPS AND MANAGING PEOPLE AND TECHNOLOGY

Dialogue

Now that IBM has introduced its multiprotocol router, do you think more users will be routing Systems Network Architecture over local-area network internets?

"I believe you'll see a lot more people out there doing SNA routing. The advantage of the IBM box over other vendor offerings is that [IBM's router] supports more protocols than regular SNA. So if you're a company like us that has Banyan [Systems, Inc.] VINES and a couple of other protocols, you'd probably buy a router that supports more protocols instead of one that just supports a few."

James Vasquez
Communications analyst
Sea-Land Service, Inc.
Elizabeth, N.J.

"I think more people will, but I'm not sure it will necessarily be because of the [IBM announcement]. I think a lot of people are looking [to route SNA], and maybe the IBM endorsement of that methodology [will] spur more activity.

"Some of the large IBM shops may take advantage of this because they are looking for ways to have the central computing organization manage services for local-area network shops that are scattered around the corporation. This gives the central MIS organization an opportunity to get into the business by appearing to do something good for LAN customers."

Bill Yundt
Director of networking and communications systems
Stanford University
Palo Alto, Calif.

"I definitely think they will because it presents a big advantage to do that for two reasons. First, in our case, we'll get dynamic load balancing across the network. Second, because the balancing is done dynamically, if there is a loss of a link, the users will not have session interruption, which is what you have now with pure source routing."

Steve Coppel
Telecommunications executive
First National Bank of Maryland
Baltimore

Negotiating a price tag for outsourcing requires skill

IS managers must look at entire financial picture.

Last in a three-part series examining outsourcing contract negotiations.

By Robert Zahler
Special to Network World

For many companies, reducing costs is the primary reason to consider outsourcing network or data center operations. Thus, it is imperative that information systems (IS) managers pay close attention to pricing issues when negotiating an outsourcing contract.

Here are some important points to keep in mind when evaluating vendor proposals and negotiating at the bargaining table.

■ **Maintain a competitive environment.** To obtain the best outsourcing deal, IS managers need to make the evaluation process as competitive as possible. IS managers should bid the contract to multiple vendors as well as the in-house IS group. Having a number of bids to compare will enable IS managers to more accurately identify the true market value for an outsourcing contract.

■ **Evaluating the bid.** Objectively evaluating bids is not easy. Typically, vendors structure bids to include a base price for a predefined set of services and additional charges for new or added services. However, the contents of bids may vary greatly. Some vendors may offer services that others do not, and all bids are based on different projections of future data processing and network volumes, costs and economic conditions.

Consequently, IS managers must adjust the bids so that an accurate comparison can be made. This usually requires calling vendors to obtain additional information so that all bids are fairly and accurately represented.

■ **Volume charges.** Vendors' bids usually include adjustments for increased volume and sometimes credits for decreased volume. Volume charges often are priced in terms of functional units, such as the number of accounts or transactions processed, or resource units, such as processing minutes, gigabytes of data storage or net bandwidth.

Each approach has benefits and disadvantages, and either one may be appropriate depending on the customer's IS environment.

Functional units give the vendor an incentive to be efficient because the vendor is compensated for the work produced, not the level of resources used. But resource units make it easier for the vendor to add or change a customer's service in order to meet changing business demands.

■ **New services.** Because outsourcing contracts tend to be long-term, IS managers should ask vendors how they plan to charge for providing new or modified services.

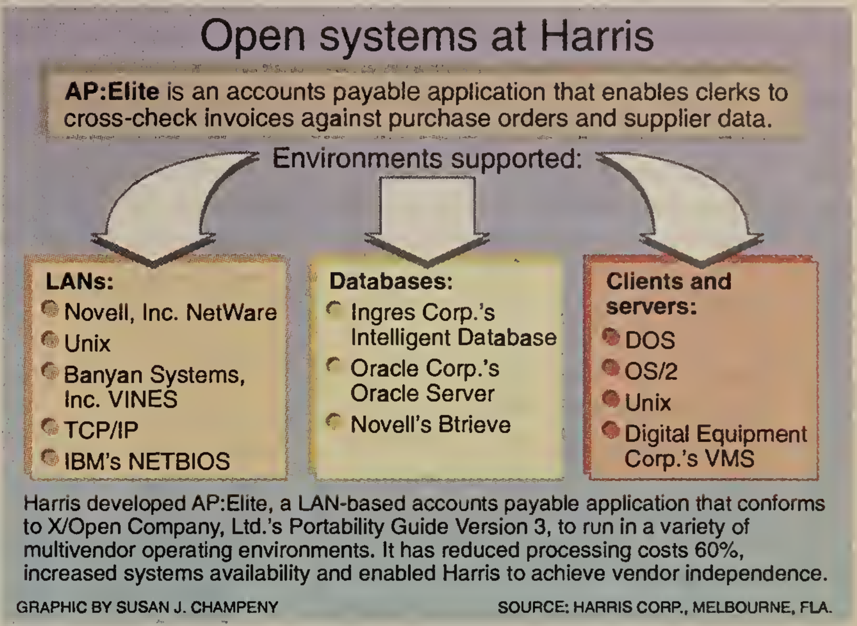
(continued on page 30)

EXECUTIVE BRIEFS

BY SKIP MACASKILL

Hawking information wares on-line. The American Information Exchange Corp. (AMIX), a subsidiary of Autodesk, Inc., has announced AMIX Service, an on-line marketplace where sellers and buyers of information products and consulting services can do business via personal computers and modems. Customers can use AMIX Service to purchase information, such as text, graphics and software, from consultants and other information providers. To make a purchase, customers scan a list of offerings and make a selection with a keystroke. The requested information is then transferred from the AMIX host to the buyer's PC. The buyer's credit card account is charged, and the seller's account with AMIX is credited.

For more information, contact Gayle Pergamit at (415) 856-1234, Ext 206.


Open systems at Harris
AP:Elite is an accounts payable application that enables clerks to cross-check invoices against purchase orders and supplier data.
Environments supported:
LANs:
Novell, Inc. NetWare
Unix
Banyan Systems, Inc. VINES
TCP/IP
IBM's NETBIOS
Databases:
Ingres Corp.'s Intelligent Database
Oracle Corp.'s Oracle Server
Novell's Btrieve
Clients and servers:
DOS
OS/2
Unix
Digital Equipment Corp.'s VMS

Harris developed AP:Elite, a LAN-based accounts payable application that conforms to X/Open Company, Ltd.'s Portability Guide Version 3, to run in a variety of multivendor operating environments. It has reduced processing costs 60%, increased systems availability and enabled Harris to achieve vendor independence.

GRAPHIC BY SUSAN J. CHAMPENY SOURCE: HARRIS CORP., MELBOURNE, FLA.

Harris reaps benefits from open systems

Applications built to X/Open specifications let firm deploy programs across multivendor platforms.

By Wayne Eckerson
Senior Editor

MELBOURNE, Fla. — When it comes to deploying applications across multivendor platforms, there are many skeptics and few examples of how implementing standards-based technology can pay off.

Harris Corp. is one notable exception. The semiconductor and communications systems manufacturer has rolled out more than 50 applications that were developed to run in a variety of multivendor computer and network environments.

Most of these applications were developed in conformance with interoperability specifications designed by X/Open Company, Ltd., a consortium of 80 hardware and software vendors and user companies committed to building an open, multivendor application environment based on de facto and international standards.

Harris' commitment to open systems, which extends back to the mid-1980s, has saved the firm a significant amount of money in development and processing costs, greatly increased productivity and helped it achieve a greater degree of vendor independence.

Harris is providing X/Open with a case study of an accounts payable application that it developed to work with multiple databases and a variety of network and computer platforms. X/Open is building a repository of similar studies in order to demonstrate the benefits of migrating to open systems.

AP:Elite

The new accounts payable product, dubbed AP:Elite, is a client/server application that Harris has rolled out on different local-area networks throughout the company and support different vendor databases (see graphic, this page).

AP:Elite conforms to the X/Open Portability Guide Version 3 (XPG3), a set of international and de facto standards for application interfaces and operating systems that enable Harris to deploy AP:Elite across its diverse computing and network environment.

The product allows clerks using personal computers or workstations to cross-check invoices against outstanding purchase orders and update accounts in their division's general ledger, which is stored on a local LAN server. Every night, the processed invoices are uploaded in batch to a mainframe here, which sends out checks to suppliers.

Previously, clerks conducted these transactions using IBM 3270 terminals to access a host-based accounts payable application across the company's IBM Systems Network Architecture network.

With the old system, response times would degrade and processing costs would escalate dur-

(continued on page 30)

Harris reaps benefits from open systems

continued from page 29

ing peak usage periods and at the end of each fiscal quarter, according to Dick O'Donnell, director of information technology at Harris. Periodic network outages also prevented clerks from processing transactions and forced them to work overtime to complete their tasks.

AP:Elite has enabled Harris to cut system response times from seconds to subseconds, slash the number of clerks needed to edit accounts payable files in half and reduce processing costs by 60%, O'Donnell said. In one division alone, annual processing costs decreased from about $115,000 to $45,000, while in another division, costs plummeted from $335,000 to $195,000.

While many of these benefits can be attributed to moving the application from a mainframe to a LAN, O'Donnell said an important motivation for developing AP:Elite was to achieve vendor independence.

"The whole idea behind open systems is to ensure that no hardware or application is dependent on any single vendor," O'Donnell said. "That was a key issue for us."

Harris developed AP:Elite so that it could work with databases from multiple vendors and run on a variety of LANs, including Novell, Inc.'s NetWare, Banyan Systems, Inc.'s VINES, Unix, IBM's Network Basic I/O System and the Transmission Control Protocol/Internet Protocol.

"All our code [for AP:Elite] was written in total isolation of external interfaces to operating systems, databases and communications facilities, among other things," said John Dewey, staff consultant at Harris. "And if there was an [XPG3] standard that defines [the interface], we used it."

Harris used a high-level computer-aided software engineering (CASE) tool to generate a graphical model of AP:Elite. It then used an internally developed code generator to convert the CASE-based graphical model into blocks of code for the base application and specified external interfaces.

Developing applications in this manner has enabled Harris to reuse blocks of code when porting the application to new environments. This ultimately has cut down on application development time and has made it easier for Harris to implement AP:Elite in different operating environments throughout the company.

Currently, the company has developed approximately 75% of the open systems applications it uses and has purchased the remaining 25%. O'Donnell expects that ratio to flip-flop in the next three to five years, with Harris purchasing the majority of its open systems applications from vendors.

"We are really waiting for the industry to mature and third-party software developers to begin developing more standards-based products to meet user demands," he said. ☒

Negotiating a price tag for outsourcing

continued from page 29

The contract should specify a formula for pricing such services that ensures that the customer will receive certain cost savings associated with the new or revised service, such as credits for replaced equipment.

But users will have a difficult time wrestling from vendors any cost savings that result from the introduction of new technology or reduced line rates from carriers. Historically, vendors have kept these savings to ensure the deal will be profitable for them.

- **Cost of living adjustments (COLA).** Almost all outsourcing contracts stipulate that prices will increase with the cost of living according to a COLA formula.

Customers should be aware of the volatility and historical annual increase in the index or indexes used in the COLA formula. In addition, the contract should specify whether the customer and vendor will share the cost of COLA increases above a certain amount.

- **Taxes.** Some states, such as Texas and Pennsylvania, are levying sales taxes on data processing services provided by third parties. Both parties need to investigate whether the outsourcing arrangement will be subject to such a tax. If it is, the parties need to negotiate who will pay the tax or whether it will be divided between the customer and vendor.

Even if no current tax exists, the parties should consider and allocate the costs of any new tax that might be adopted during the term of the outsourcing contract. ☒

Zahler, a partner at the Washington, D.C.-based law firm of Shaw, Pittman, Potts & Trowbridge, has negotiated more than two dozen outsourcing contracts.

RAM Mobile Data and

What? Find a cus
in a green Buick b
leaves in 15 minu

National Car Rental® Thanks to RAM Mobile Data's revolutionary wireless data communications service, missing briefcases and the cars they're left in can now be found instantly. That's why National Car Rental uses RAM's mobile data service to track over 120,000 vehicles, improve vehicle maintenance management, provide better customer service, and cut costs.

Like what you hear? Then let us show you how mobile data can transform your company. With a laptop or portable computer and RAM's wireless, radio-based network, your field personnel can place orders, initiate billing, and check inventory whenever, wherever they need to. The RAM service will give your employees the ability to send and receive messages instantaneously – no matter where they are.

These are just several of the reasons why National chose RAM. Give us a call at 1-800-736-9666 and find out why RAM Mobile Data is the open road to data.™

RAM Mobile Data, One Rockefeller Plaza, Suite 1600, New York, NY 10020.

RAM Mobile Data is a joint venture of BellSouth Enterprises and RAM Broadcasting Corporation.

RAM MOBILE DATA

Sybase details plans to keep rivals at bay

continued from page 20

cations.

Network computing provides many advantages, but it also introduces a new layer of complexity. All of these things need to be looked at in the next generation of client/server computing, which is what I would like to think of as a fifth-generation application development environment.

There are all these pieces of technology — object-oriented, repository, application generation, network management, events, nonrelational objects and unstructured data. Components of these technologies are being tackled by different types of tools, but we believe they really can be integrated.

We are working on an integrated tool that will be more productive than traditional tools to allow users to build distributed applications more easily.

Another major area is security, which people are becoming more aware of through viruses and other problems. We were the first to pioneer a secure relational database, and we're going to continue to enhance our security technology. One of the toughest problems of the '90s will be the security of on-line data in distributed environments.

I think it's important to understand what we're working on and what we're not working on.

We're not going into the office automation or application development tools business because we are working on these with third parties. We want to focus on what I call advanced middleware for mission-critical enterprisewide applications — above the protocols, the operating systems and the [third-generation languages] but below the end-user applications.

Our goal is to make our technology as robust, fast, complete and productive as possible in the server, connectivity and tools area. We'll leave the application layers or ancillary layers to third parties that we'll work with.

Are your customers looking for some of these enhancements now, or are you basing your strategy on anticipating what their needs will be a few years from now?

We do almost all of our planning for advanced development in conjunction with customer partners, mainly because we want to end up building something they really want. It's not a solution looking for a problem; there are real problems they want solved, and in many cases, it's a joint development they have helped fund. What I have described are things people are very interested in. This is not Star Trek material, but real-life stuff. This technology will start coming out from Sybase in 1993, although some won't be out until 1994.

What are the network issues that are either inhibiting or facilitating the implementation of your database technology?

The network is the reason we exist — it is the computing platform for the '90s. Sybase was founded on building network-based client/server relational database systems. So we see the adoption of networking as a computing architecture as fundamental to why Sybase is here at all.

We built our products to optimize the network environment, putting various pieces on either the server side or the client side. As far as inhibiting factors, people are concerned with how to build robust distributed applications when the network or all the nodes are not always going to be available.

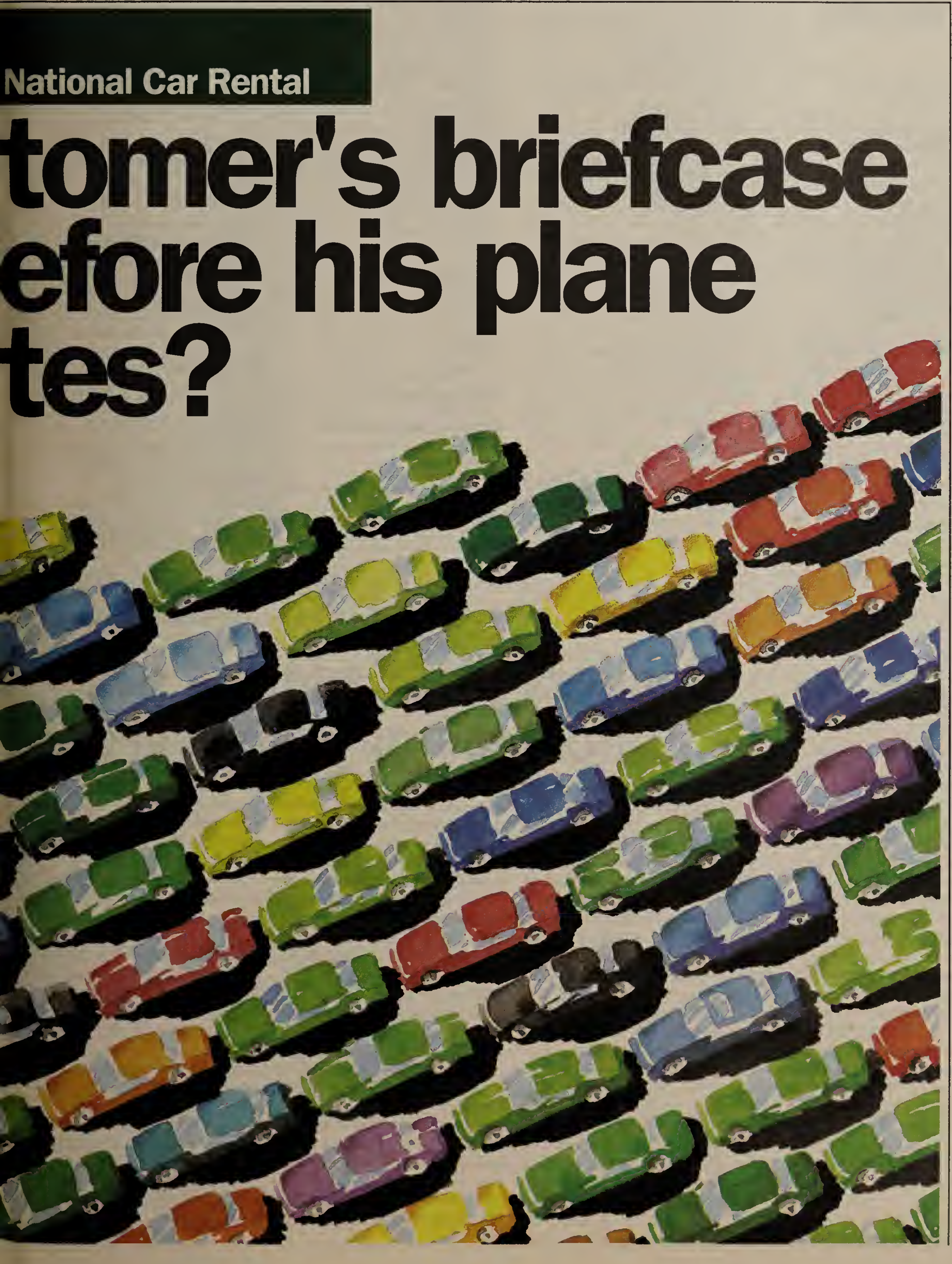
Taking this into account, users want to understand how to code, deploy, maintain, tune and administrate applications that are enterprisewide.

These are the types of products we have in our pipeline. It's the administration of the applications and the users from a higher level than basic network management, which includes diagnostic, cataloging and repository tools for managing a large, distributed network.

From my understanding, connectivity is not the issue. People feel they can connect what they need; what they can't do is achieve true interoperability. People want distributed systems to link together and to plug and play with minimal effort, so when new users, tools and databases are added, the entire system comes together easily.

Connectivity is not the problem. It's the interoperability and control that's the problem. It's building applications that run well in a distributed environment without having to design them down to the smallest detail, which makes them out-of-date before they can even be deployed.

The issues are ease of application development, administration and control, as well as performance, which is always a factor. Our advantage is that we understood right from the beginning the role of the network and we coded this support into all of our products and applications. ◼



CHARGEBACK SYSTEMS

BY EDWARD HORRELL

Management should practice what it preaches

In these recessionary times, most corporate executives are pressuring network managers to trim the fat from their telecommunications budgets. But the same executives who are shouting for corporate cost-cutting are also the biggest abusers of telecommunications services in most companies, putting network managers in an extremely awkward position.

Most industry experts estimate that as much as 30% of business telecommunications costs are associated with employee waste, abuse or misuse. Considering the proliferation of 900 numbers, cellular telephones, calling cards and the like, managing telecommunications charges is a mammoth task. And 30% is a large ticket for most companies to carry.

While tools are available to help handle employee misuse, most telecommunications managers do not have full employee support for their cost-cutting measures. They can use call detail recording and chargeback methods as well as implement employee awareness programs to help staff become less abusive of their phone usage. But these measures alone can't solve the problem.

> Chargeback systems result in a double standard for most companies.
>
> ▲▲▲

The issue can only be resolved with the full support of senior management, and you can kiss that one good-bye. Senior managers are big abusers of corporate telephone costs, and many employees think that their desk telephones are a perk. Managers who wouldn't dream of taking office supplies home won't hesitate to call grandma after hours, thinking the call is either free or close to it.

By using call detail recording reports, some departmental managers who know the calling patterns of their subordinates' jobs can identify and charge employees that are making personal calls. One drawback to using chargeback systems is that they result in a double standard for most companies. In an informal survey of firms with chargeback policies, none were charging back senior management for personal telephone calls.

Unfortunately, identifying the problem is easier than solving it. Few net managers are eager to commit corporate suicide by announcing to their superiors, "We have found the enemy, and it is you." But short of that, there is not much they can do.

Telecommunications managers are in a jam with this one. It's true that not all network managers have this problem, but what about the majority who can accurately trace the significant costs of management abuse? Can the answer be found in employee campaigns or the establishment of policies that apply to everyone in the organization and chargeback systems? What about a good old "let's talk about this, Mr. Executive" session?

In a closely held or private company, those solutions are a net manager's only recourse. But in a public firm, shareholders wouldn't be thrilled to hear about senior management's abuse of the phone system. Senior executives must stop stealing from their own firms and start playing by the same rules as the rest of the staff. This is not George Orwell's *Animal Farm*. Write the same rules for everyone and abide by them.

Horrell is president of The Horrell Consulting Firm, Inc. in Memphis, Tenn., and a member of the Society of Telecommunications Consultants.

NETWORK WORLD

Editor
John Gallant

Executive Editor
John Dix

Assistant Managing Editor — News
Paul Desmond

Senior Editors
Bob Brown — Industry Update
Wayne Eckerson — Management Strategies
Bob Wallace — Global Services

Michael Cooney — Data Net Architectures
14701 Bentley Square
Centreville, VA 22020
Phone: (703) 830-8138
Fax: (703) 830-7963

Jim Duffy — Data Net Architectures
115 E. 27th St., #1C
New York, N.Y. 10016
Phone: (212) 481-3095
Fax: (212) 679-0147

Caryn Gillooly — Local Networking
5423 Gladewright Drive
Centreville, Va. 22020
Phone: (703) 266-1537
Fax: (703) 266-1543

Staff Writers
Joanne Cummings — Internetworks
Maureen Molloy — Internetworks

West Coast Bureau
Timothy O'Brien
Bureau Chief/Enterprise Applications
Phone: (415) 771-3530

Margie Wylie
Senior Editor/Local Networking
2088 Union Street, Suite 2
San Francisco, Calif. 94123
Phone: (415) 771-4103
Fax: (415) 771-2817

Washington D.C. Bureau
Anita Taff
Bureau Chief/Global Services
Phone: (202) 879-6744

Ellen Messmer — Industry Correspondent
National Place
1331 Pennsylvania Ave. NW, Suite 505
Washington, D.C. 20004
Phone: (202) 879-6752

Features Editor
Charles Bruno

Managing Editor — Features
Jim Brown

Associate Features Editors
Susan Collins
Alison Conliffe

Features Writer
Salvatore Salamone

Design Editors
Susan Champeny
Susan Slater

Assistant Managing Editor — Production
Beth Khoury

Associate Editor
Michelle Beaulieu

Copy Editors
Skip MacAskill
Elizabeth Marshall
Karen Moltenbrey

Assistant to the Editor
Cheryl Tynan

Editorial Assistant
Glenna Fasold

Contributing Editors
Daniel Briere
James Kobielus
Alan Pearce

Teletoons
Phil Frank
Joe Troise

President/Publisher
Colin B. Ungaro

Director of Financial Operations
Mary Fanning

Network World
161 Worcester Road
Framingham, Mass. 01701
(508) 875-6400
MCI Mail — 390-4868
Fax: (508) 820-3467

USER ADVISORY PANEL

Laurie Bride
Manager, Communications Technology,
Boeing Computer Services
Roy Bruce
Senior Adviser, International Communications Association
Byron Comp
President, Association of Banyan Users International
Network Administrator, Precision Systems, Inc.
Phillip Evans
Director, Telecommunications, FMC Corp.
Senior Advisor, International Communications Association
Len Evenchik
Director of Communications,
The Commonwealth of Massachusetts
Thomas Festa
Communications Director, Liberty Brokerage, Inc.
Lionel Gillerman
Telecommunications Services, McDonnell Douglas
Aerospace Information Services Co.
Vice-President for Regulatory Affairs,
Tele-Communications Association, Inc.
Robert Hamilton
Information Technology Engineer, Hewlett-Packard Co.
President, Tele-Communications Association, Inc.
E.W. Bud Huber
Senior Consultant, Hughes Aircraft Co.
Chairman, User Alliance for Open Systems
Michael Kaminski
Manager, CIM/Networking Technologies
General Motors Corp.
Michael Kilbane
President, International Communications Association
General Manager of Systems Development,
Diamond Shamrock R&M, Inc.
Ron Kopitowsky
Telecommunications Director, Metropolitan
Transportation Authority of New York State
First Past President
Communications Managers Association
Charles Murray
President, Communications Managers Association
Telecommunications Director, The Travelers Insurance Co.
Chuck Papageorgiou
Network Administrator, United Parcel Service, Inc.
Henry Pfendt
Director, Information Technology Services,
Eastman Kodak Co.
Kenneth Phillips
Vice-President, Office of Telecommunications Policy,
Citicorp
Chairman, Committee of Corporate
Telecommunications Users
William Pomeroy
Director of Telecommunications Public Policy,
International Communications Association
Richard Sidoli
Telecommunications Director, Morgan Stanley
Laura Swanton
President, NetWare Users International
Manager of Technical Services, Bryant Universal Roofing, Inc.
Stanley Welland
Manager, Corporate Telecommunications
General Electric Co.
Ronald West
President, Association of Data Communications Users
Manager of Telecommunications and Office Automation,
Shearman & Sterling

EDITORIAL

Vendors must address key limitations of groupware

Groupware is the one emerging technology that seems to offer the greatest impact on end users of corporate networks. So it was encouraging to hear that Lotus Development Corp. plans to offer a NetWare Loadable Module (NLM) of its Notes software.

Network managers, however, shouldn't be overjoyed by the announcement. True, an NLM version of Notes will make it easier for users to install and maintain the software on Novell, Inc. NetWare local-area nets. But there are bigger issues groupware vendors must address.

Lotus and other groupware suppliers need to beef up their products' support for bread-and-butter business applications. Groupware products today lack broad support for popular applications that would enable workers to simultaneously modify the same spreadsheet or word processing file in a discussion mode. Groupware vendors in the past have used their own file formats and directory services, resulting in limited information sharing with business applications.

To its credit, Lotus is moving to open Notes to support SQL and has even served up its own open messaging interface for third parties as a means of facilitating data exchange among applications. But smaller groupware vendors can't command such attention and must rely on emerging open messaging interfaces, such as Microsoft Corp.'s Messaging Application Programming Interface and the Vendor Independent Messaging (VIM) interface, to serve as a bridge to applications.

On a separate front, groupware vendors also need to step up support for multiple hardware platforms. The fact that users may not be able to tie together all work group members because the software is not available on certain machines defeats the primary objective of deploying such a product.

If groupware is going to catch on, vendors must address these limitations in relatively short order. If they don't, groupware is destined to meet the same fate as Integrated Services Digital Network and become a promising technology that may never fully meet user expectations.

DISTRIBUTED COMPUTING

BY JOHN R. RYMER

It's time to put client/server computing in its place

Too many users and vendors believe that the client/server model is the only useful basis for distributed applications. They seem to have completely forgotten that the peer-to-peer model is better for some distributed applications.

Both are legitimate and useful models for building distributed applications. In the peer-to-peer model, each application is a peer — not a piece of a larger application. In any interaction, a peer may behave as a client or a server, depending on the situation and the application need. Peers communicate by sending each other messages containing data, requests for performance of an action or notifications of conditions.

Unfortunately, the term client/server has come to mean a lot more than it rightfully should. First, many users confuse the client/server model with the tools used to implement it. Some would have you believe that to implement client/server applications, you must use a remote procedure call (RPC). However, distributed file applications and remote data access technologies are not best implemented using RPCs.

A second misconception is that the client/server model can support any distributed application. Developers who have tried to use RPCs to build groupware applications, for example, have found the job to be overly complex.

The peer-to-peer model is better than the client/server model for supporting the following types of applications:

- **Work flow applications.** In this application, a group of users or applications completes a task by passing information that requires action to one another. A work flow application, for example, may automate the approval of purchase order requests. With such an application, a server in a purchasing department may only forward a request from one client to another client but not respond directly with the approval. Rather, the approval may come from the last manager who reviews the request. Thus, the application doesn't fit the client/server model's request/response pattern.

> The client/server model really helped the PC grow up and get a real job.
>
> ▲▲▲

- **Event-driven applications.** In these, an application performs a function in response to user input, a time or a date, a change in the state of a piece of data or another condition. Consider, for example, a database agent — an application that keeps track of a piece of data. When the data is updated, the agent notifies one or more users of the change. It is difficult to see how the request/response mode of communication typical of the client/server model fits this application.
- **Dynamic application coupling.** In these situations, users need to get two applications to communicate, regardless of incompatible hardware, operating systems, file formats and so forth.

A user who needs a product design created on a Unix system for inclusion in a marketing proposal created in WordPerfect Corp.'s WordPerfect, for example, may need to tap the Unix system for such data once a year or many times a month. If the user of the Unix system needs WordPerfect data, the roles are reversed.

The nature of the communication may be client/server or a more conversational peer-to-peer model. In such situations, the client/server model can constrain users by forcing the role of client on them.

The peer-to-peer model has suffered due to a lack of acceptance primarily because the tools available to implement it have been too complex for users to figure out.

However, new distributed object management tools from Digital Equipment Corp., Hewlett-Packard Co., HyperDesk Corp., NCR Corp. and Sun Microsystems, Inc. and interapplication messaging tools from Horizon Strategies, Inc. and PeerLogic, Inc. are making it easier to build peer-to-peer applications.

Distributed computing owes the client/server model a debt of gratitude. It wasn't until we all started to understand clients and servers that local-area networks really took off as applications platforms. The client/server model really helped the personal computer grow up and get a real job.

But after struggling for about 30 years to get computers to do useful work for us, we should know better than to place our faith in any particular approach or technology.

The client/server model is and will continue to be useful for years to come, but not for every distributed computing application. ◘

Rymer is vice-president of Patricia Seybold's Office Computing Group in Boston and editor in chief of Patricia Seybold's Network Monitor, *a monthly report devoted to distributed computing.*

HAVE YOU SURVIVED AN ALLIGATOR ATTACK? If you solved an unforeseen problem that plagued your network, write an article about it for our "Alligators in the Swamp" section.

Alligators should be 1,200 words in length and submitted on disk, via modem or through MCI Mail at 390-4868.

If you have an idea for an Alligator article, call Susan Collins, associate features editor, at (508) 820-7413 or fax your idea to us at (508) 820-3467.

TELETOONS

BY FRANK AND TROISE

The History of Networking
August 28, 112 A.D.
Early Telemarketing
BUY NOW
BUY NOW
BUY NOW
BUY NOW
Okay.. they should be awake by now. Start soliciting.

LETTERS

Battle over competition

A recent opinion column, in which Mark Langner took the position that loosening unfair regulatory restrictions on AT&T would harm competition ("AT&T deregulation may stifle long-distance competition," *NW,* March 16), is far off-base.

Competition in the telecommunications marketplace is fierce. That is precisely why AT&T's market share has declined so dramatically and users have been the beneficiaries of so many technological innovations and pricing options in recent years.

What continues to baffle users, however, is that an outdated system of regulation that applies to AT&T — and only to AT&T — continues to be a barrier to the full benefits of open competition.

Delays in getting new services in place, the inability to reconfigure systems and obtain lower prices, and a guessing game about regulatory review are the result.

It is clear that only AT&T's competitors are protected by the current regulatory scheme, while users are penalized.

That is why, as the article points out, it is users that have been telling the Federal Communications Commission that they are disadvantaged by constraints on Tariff 12 offerings. They are paying the price for needless regulation of a competitive market.

The article further states that the FCC should stop allowing itself to be intimidated by telecommunications users and, instead, regulate in the best interests of the industry. But regulation is intended to serve the interests of users — not competitors.

(continued on page 40)

Network World *welcomes letters from its readers.*

Letters should be typed and double-spaced. Mail them to Editor, Network World, *161 Worcester Road, Framingham, Mass. 01701.*

Letters may be edited for space and clarity.

ONE TALKS. THE OTHER EMBEZZLES.

I can combine voice, data, fax and LAN over low-cost phone lines and save money.
drat!
micom
stat mux

Time was, the old stat mux was the best way to save money.

Those days are gone. Your data-only multiplexer is costing you lost savings every day you use it.

For about the same price as a stat mux, you can now buy a data/voice network server able to combine remote voice, data, fax and LAN traffic over one low-cost leased line at speeds from 9.6K to 56/64 Kbps. It's called Marathon 1K and it's a breakthrough in technology and fast payback.

Using the same private line for voice and fax as well as data and LAN traffic can save big bucks month after month on phone company toll charges. So Marathon 1K can pay for itself in just a few months, and after that all the savings go to your company's bottom line.

Products that don't save your company money are no more than profit robbers. Get Marathon instead.

Call for a free compressed voice demonstration or attend a Data/Voice Integration Workshop. Call toll-free: 800-MICOM-US [800-642-6687] or 805-583-8600 for the certified Marathon distributor in your area. 24-hour fax: (805) 583-1997.

Call today and stop wasting money.

micom®

COME SEE A LIVE MARATHON DEMONSTRATION AT ICA BOOTH #645 AND INTEROP SPRING BOOTH #1535

DATACOM

BUYER'S GUIDE

SUBRATE MULTIPLEXERS

The rejuvenated subrate multiplexer

Ability to mix compressed voice, video and data traffic on circuits at below T-1 speed is making subrate multiplexers attractive once again.

CONTINUED FROM PAGE 1

The established international networking circuit rate is 64K bit/sec. Subrate muxes naturally lend themselves to such a speed. The fairly high costs of a European T-1 circuit has prompted all but the largest users to rely on subrate muxes and slower speed circuits for international links.

However, some European users are beginning to use 128K and 256K bit/sec circuits. To be most useful, subrate multiplexers must support those fractional T-1 composite link speeds.

In the U.S., subrate multiplexers are used between sites that cannot justify a full T-1 line and to feed traffic from low-volume sites into a private T-1 or T-3 backbone. The typical U.S. subrate mux is designed to operate over a single 56K or 64K bit/sec circuit. However, this is expected to change during the coming year as vendors enhance their products to support fractional T-1 and expand their operations overseas.

The accompanying chart lists the various transmission rates and other features for 22 subrate multiplexers. Some products listed, such as Motorola Codex's 6250 Network Multiplexer and Bayly Communications, Inc.'s Omniplexer, can be classified as T-1 multiplexers because both support a T-1 composite link.

However, both were designed primarily as feeder multiplexers, gathering subrate channel inputs and transmitting them to the corporate backbone over composite links operating at various speeds — 56K bit/sec to T-1 for the 6250 and 1,200 bit/sec to T-1 for the Omniplexer.

Subrate applications

It is the ability to handle voice that is key to this new breed of subrate muxes. Only a relative

(continued on page 37)

CHART • GUIDE

A Buyer's Guide chart comparing subrate data multiplexers begins on page 36.

Subrate data muxes

Vendor	Product/ Type	Number of input ports/ Port speed	Maximum combined input rate	Input interfaces/ Input types	Voice modulation	Carrier network Interfaces/ Standards supported	Carrier services supported/Clocking sources	Number of composite links/ Composite link speeds	User-programmable features	Price/ Warranty
Advanced Compression Technology, Inc. **Simi Valley, Calif.** **(805) 527-2281**	SDM-T Multiplexer/ TDM	14/1,200 to 115K bit/sec	128K bit/sec	RS-232, RS-449, V.11, V.35, E&M, loop start, ground start, off-premises extension/ Voice, data, fax	Adaptive transform coding, multiband exiting	DDS, fractional T-1/DDS, X.50	DDS, fractional T-1, frame relay, ISDN/ Internal, external, network	2/9.6K to 128K bit/sec	Port rates, link rates, clocking, dynamic bandwidth parameters, port interfaces, link interfaces, satellite delays, framing protocol, voice interface, power level, fax interface	Starts at $3,000/ 1 year
Ascom Timeplex, Inc. **Woodcliff Lake, N.J.** **(800) 669-2298**	microLINK/2+/ TDM	Up to 16/50 to 1.984M bit/sec	1.536M bit/sec	RS-232, CCITT V.24, RS-422, CCITT V.11 (X.21), V.35, MIL-STD 188-114, balanced, unbalanced RS-423, CCITT V.10, OCU per Bellcore specification, 2- and 4-wire E&M Types IA, IC, ID, II, III, V, 2-wire loop start, ground start/Voice, data, video	PCM, ADPCM, CVSD, FXS, FXO, proprietary low bit rate at 8K and 16K bit/sec	RS-422, CCITT V.11 (X.21), V.35, MIL-STD 188-114, balanced, unbalanced, DSX-1/DDS, DS0-A, DS0-B, fractional T-1, E-1	Switched 56K bit/sec, 56K bit/sec DDS, fractional T-1, AT&T's Accunet T1.5, AT&T ISDN Primary Rate Interface (1.536M bit/sec)/Internal, external, network	Up to 4/4.8K to 2.048M bit/sec	Channel speed, aggregate speed, parity, routing, connect channel on raising of specified control lead	Starts at $7,500/ 1 year
Astrocom Corp. **St. Paul, Minn.** **(612) 227-8651**	Astrocom 8300 Voice and Data Multiplexer/ TDM	6 to 12 (more available)/ 2,400 to 19.2M bit/sec	123K bit/sec	RS-232, 2- and 4-wire E&M/Voice, data	Proprietary	V.35, RS-422, V.11 or RJ-45/ DDS, DS0-B	DDS, fractional T-1/ External, network	1/48K to 128K bit/sec	None	$4,840 (with 2 voice channels)/2 years
Bayly Communications, Inc. **Ajax, Ontario** **(416) 686-1011**	Omniplexer/ TDM	480/1,200 to 1.536M bit/sec	48K bit/sec	RS-232/Voice, data	PCM, ADPCM	DS1, DS2, E-1, E-2/DS0-B	T-1, E-1/Internal, external (carrier network DS1)	32/1,200 to 1.536M bit/sec	Data rates, channel selection	$3,500 for base unit/1 year parts and labor
Coastcom, Inc. **Concord, Calif.** **(510) 825-7500**	SDM card for D/I Mux III/ TDM	5 (10 optional)/Up to 19.2K bit/sec	48K bit/sec	RS-232/Data (voice supplied through D/I Mux III)	PCM, ADPCM	T-1/DDS, DS0-A, DS0-B	DDS, 800, T-1/ Internal, external (carrier T-1 line and DTE)	2/1.544M bit/sec (through D/I Mux III)	DTE data rate, T-1 port selection, DS0-A and DS0-B assignment	$1,200 per 5-port card/ 2 years
Dataproducts New England, Inc. **Wallingford, Conn.** **(800) 243-4485**	AXXESS/1/ TDM	32/Up to 512K bit/sec	2.048M bit/sec	RS-232, RS-422, V.35, MIL-STD 188-114A, analog/Voice, data, video	PCM, ADPCM, CVSD, 4.8K CELP, 2-wire FXS, FXO, 4-wire E&M	RS-232, RS-422, RS-423, V.35/ DDS, fractional T-1	Analog (modem), DDS, T-1, satellite/ Internal, external, station, simplex, asymmetric, broadcast	1/1,200 to 2.048M bit/sec	Full-duplex, simplex, broadcast, asymmetric, cyclic redundancy check, statistical multiplexing, subrate multiplexing, downline loading	$4,100/ 1 year
Data Race, Inc. **San Antonio, Texas** **(512) 558-1900**	Mach DS 64/Statistical mux	8 to 64/600 to 19.2K bit/sec	19.2K bit/sec	RJ-45, RS-232/Voice, data, fax	ADPCM	RJ-48, V.35/DDS, AT&T Technical Publication 62310	4-wire unconditioned, 56K bit/sec DDS, 64K bit/sec digital/External	2 to 20/2,400 to 64K bit/sec	Tail circuit destinations, vendor flow control, port destinations, voice/fax destinations	$13,500/ 2 years
Dowty Communications, Inc. **Annapolis Junction, Md.** **(800) 227-3134**	DCP 9060 Time Division and Subrate Multiplexer/ TDM	30/300 to 64K bit/sec	384K bit/sec	RS-232, V.35, RS-422/ Voice, data	ADPCM (16K and 32K bit/sec), PCM (64K bit/sec)	EIA RS-232, RS-449, RS-422, V.35, internal data service unit/ channel service unit/DDS, DS0-B	AT&T Technical Publication 54075/ Composite, internal; external	1/9.6K to 384K bit/sec	None	$2,750/ 1 year
Frame Relay Technologies **Costa Mesa, Calif.** **(714) 668-0222**	FrameMux 600VX/Frame relay	8 or more/ 1,200 to 384K bit/sec	1.536M bit/sec	RS-232, V.35, RS-449, RS-422, E&M, loop start, ground start, Ethernet attachment unit interface/Voice, data, fax, LAN	ATC, multi-band exiting	DDS, fractional T-1, fractional E-1, T-1, E-1/ DDS, X.50	DDS, fractional T-1, fractional E-1, T-1, E-1, ISDN, frame relay/Internal, external, network	2/9.6K to 1.536M bit/sec	Port rates, link rates, clocking, dynamic bandwidth parameters, interfaces, delay compensation, framing protocols, voice interface, power levels, fax selection, frame relay routing, frame relay network/user trunk/line	Starts at $11,730/ 1 year
Gandalf Systems Corp. **Cherry Hill, N.J.** **(609) 424-9400**	Infotron 2120/TDM	14 (plus 1 LAN)/512K bit/sec	1.544M or 2.048M bit/sec	RS-232, V.11, V.35, 2- and 4-wire E&M Types I, II, IV, V/Voice, data, video, token ring, Ethernet	ADPCM, proprietary (6.5K to 32K bit/sec)	DSX-1, CCITT G.703/DDS, G.703, DSX-1	AT&T ASDS, Accunet Reserved, Megacom, switched 56K bit/sec/ Internal, external, carrier link	1/9.6K to 2.048M bit/sec	None	$3,000 to $11,000/ 1 year
General DataComm, Inc. **Middlebury, Conn.** **(203) 574-1118**	Kilomux 1291/TDM	16/50 to 384K bit/sec	384K bit/sec	RS-232, 4-wire E&M/ Voice, data, video, LAN	ADPCM (16K to 32K bit/sec)	RS-232, RS-422, RS-423, V.35, G.703/DDS	DDS, leased lines, fractional T-1, switched 56K bit/sec, satellite/Internal, external	1/2,400 to 384K bit/sec	Port voice and data rates, port control leads, data type (synchronous, asynchronous), loopbacks, downline loading to remote multiplexer, alarm status	$1,500/ 1 year
Micom Communications Corp. **Simi Valley, Calif.** **(800) 642-6687**	Marathon 5K/Fast packet	Data: up to 41 asynchronous channels, 6 synchronous channels; voice/fax: up to 8 channels; LAN: up to 2 direct Ethernet connections/ 50 to 20M bit/sec (LAN links)	20M bit/sec (LAN links), 384K bit/sec (network links), 128K bit/sec (voice/data channels)	RS-232, V.35, X.21, V.11, RS-530, RS-449, E&M Types I to V, FXS, FXO, 2- and 4-wire, 802.3 LAN, 10Base5 and 10Base2/Voice, data, fax, Ethernet LAN	ATC (4.8K to 16K bit/sec)	4-wire DDS, RS-232, V.35, X.21, V.11, RS-530, RS-449/DDS, Code Excited Linear Prediction L1 and AC15, EIA/Telecommunications Industry Association-464	DDS, ASDS ISDN, Advanced Digital Network, hubless DDS, fractional T-1, voice-grade lines/ Internal, external	5/9.6K to 148.8K bit/sec	Voice interfaces, voice digitizing rates, synchronous and asynchronous data rates, channel characteristics, routing types, node names, resource classes, all LAN bridge parameters, all terminal server parameters, all user parameters involved in asynchronous port switching and contention	Starts at $2,750/ 3 years
Motorola Codex **Mansfield, Mass.** **(508) 261-4000**	6250 Network Multiplexer/ TDM	90/2,400 to 1.5M bit/sec	12M bit/sec	EIA 232-C, V.35, V.36, EIA 530, V.11, 4-wire E&M, 2-wire FXS and FXO, OCU/Voice, data, video	PCM, ADPCM (16K, 24K and 32K bit/sec)	D4 framing, format, DSX-1, V.35, G.703, G.704, V.36, EIA 530/DDS, DS0-A, DS0-B	DDS, ASDS, Megacom, Megastream, AT&T SDM standard, M24, Accunet T1.5/ Internal, network	6/56K to 2.03M bit/sec	DS0-A, DS0-B or proprietary subrate multiplexing, subrate switching of voice and data, bypass drop-and-insert to groom and fill circuits, voice compression, automatic rerouting, network management features	Starts at $5,500/ 1 year on-site

Subrate data muxes

Vendor	Product/ Type	Number of input ports/ Port speeds	Maximum combined input rate	Input interfaces/ Input types	Voice modulation	Carrier network interfaces/ Standards supported	Carrier services supported/Clocking sources	Number of composite links/ Composite link speeds	User-programmable features	Price/ Warranty
Network Equipment Technologies, Inc. **Redwood City, Calif.** **(415) 366-4400**	ADNX/60/ TDM	30/1,200 to 64K bit/sec	512K bit/sec	RS-232, V.24, 4-wire E&M/Voice, data	8K and 16K bit/sec ADPCM	V.24, V.35, V.11, X.21/DDS	DDS, satellite, modem, switched 56K bit/sec/Trunk or internal	2/9.6K to 512K bit/sec	Primary and backup trunk settings, port and trunk speeds, voice compression, E&M type, transmission and receive levels, call priority, call preempt priority, echo canceler parameters	$6,000/ 90 days on-site
Newbridge Networks, Inc. **Herndon, Va.** **(703) 834-3600**	3606 Mainstreet Little Mux/ TDM	4 data and 2 voice, or 12 data/150 to 64K bit/sec	256K bit/sec	RS-232, V.35, RS-449, data terminal unit/Loop start or ground start, exchange; loop start or ground start, subscriber; manual ringdown; E&M	Proprietary high-capacity voice	V.35, X.21 (RS-449, RS-422)/ DDS	DDS, fractional T-1/ Internal, external, independent	1/32K to 256K bit/sec	All parameters and features are software programmable	$2,800/ 14 months
Pacific Communications Sciences, Inc. **San Diego** **(800) 933-7274**	Clarity CS8000 Access Multiplexer/ TDM	8 voice, 4 to 20 data/75 to 128K bit/sec	128K bit/sec	RS-232, RS-422, V.35, E&M Types I to V, FXO, FXS, 2- and 4-wire/ Voice, data, fax	ATC, CELP	V.35, V.11, RS-422, fractional T-1/DDS	DDS, ASDS, Advanced Digital Network, fractional T-1, voice-grade lines/Internal, external, slave	1/19.2K to 128K bit/sec	All features and switches are software programmable, including port rates and interface types for voice and data	Starts at $2,750 (plus $1,595 for voice)/ 1 year
Racal-Datacom, Inc. **Sunrise, Fla.** **(305) 846-5157**	Omnimux 800 TDM/TDM	Up to 32/Up to 384K bit/sec	768K bit/sec	RS-232, RS-422, V.35/ Voice, data, video	ADPCM (33.6K bit/sec), Proprietary Algorithm 16 (16K bit/sec)	V.35, V.11, RS-422/DDS	DDS, satellite, voice grade/External	Up to 4/9.6K to 76K bit/sec	Set control signal leads, set synchronous/ asynchronous operation, port clocking selection (internal or external), central/remote selection, channel speeds	Starts at $1,950/ 1 year
RAD Data Communications **Mahwah, N.J.** **(201) 529-1100**	KiloMux 2000/TDM	24/1,200 to 56K bit/sec	384K bit/sec	RS-232, V.35, RS-422, X.21/Voice, data, video, fax	PCM, ADPCM, proprietary low bit rate voice	V.35, RS-530, V.36, RS-232, X.21, G.703/DDS, DS0-A, DS0-B, X.50	DDS, fractional T-1/ DTE, DCE, external DCE	2/56K to 384K bit/sec	Configuration parameters, selectable link bit rates, timing options	Starts at $1,500/ 1 year
Republic Telcom Systems Corp. **Boulder, Colo.** **(800) 822-6227**	RLX VoicePacket Multiplexer series/Packet mux	16 voice, 4 data/Up to 128K bit/sec (options available up to 2.048M bit/sec)	19.2K to 2.048M bit/sec	RS-232, V.11, V.35, V.36, 4-wire E&M, 2-wire FXO, 2-wire FXS, T-1, E-1/Voice, data, video, fax	Proprietary VoicePacket technology, time domain harmonic scaling, CELP	RS-232, V.11, V.35, V.36/DDS, ISDN, fractional T-1, fractional E-1, T-1, E-1	DDS, fractional T-1, fractional E-1, kilo-stream, switched digital services, ISDN, satellite/External	1 or 2/19.2K to 64K bit/sec or 19.2K to 128K bit/sec	Time-of-day bandwidth management, trunk group selection, switched digital support, Voice-Packet networking	Starts at $4,995/ 1 year (factory)
Scitec Communications Systems, Inc. **Fremont, Calif.** **(510) 226-1818**	BSPT1/TDM	128/300 to 2.048M bit/sec	2.048M bit/sec	RS-232, V.35, RS-449/Voice, data, video	Proprietary, PCM, ADPCM (16K and 24K bit/sec)	DSX-1/DDS	DDS, T-1, E-1/ Internal, external	1/9.6K to 2.048M bit/sec	None	$4,500/ 1 year
Telco Systems Network Access Corp. **Fremont, Calif.** **(800) 776-8832**	Route-24/ TDM	Up to 20/2,400 to 48K bit/sec	64K bit/sec	RS-232/Data	PCM, ADPCM	DS1, D3, D4/DDS, DS0-A, DS0-B, cellular	DDS, 64K private line, T-1/Internal, external	24/2,400 to 1.536M bit/sec	Bit rate, request-to-send control, loopback tests (drop and network)	Starts at $3,321/ Up to 5 years
Telemax Corp. **Lisle, Ill.** **(708) 241-0909**	Telemax DAWN 2200 Series/TDM	4/2,400 to 19.2K bit/sec	51.2K bit/sec	RS-232, RJ-11C, RJ-48, FXO, FXS, E&M/Voice, data	ADPCM (16K bit/sec)	V.35/DDS	56K bit/sec DDS or equivalent/Internal, external	1/56K bit/sec	Data speeds, synchronous/asynchronous operation, master/slave timing, FXO, FXS, ringdown, 2- or 4-wire E&M/Tie line selection	$2,295 to $2,495/ 2 years

ADPCM = Adaptive differential pulse code modulation
ASDS = Accunet Spectrum of Digital Services
ATC = Adaptive Transform Coding
CELP = Code Excited Linear Prediction
CVSD = Continuous Variable Slope Delta (voice compression method)
DCE = Data communications equipment
DDS = AT&T Dataphone Digital Service or generic digital data service
DS0-A = Digital Signal 0 with a single-rate adapted channel
DS0-B = Digital Signal 0 with multiple channels subrate-multiplexed in DDS format
DSX = Digital cross-connect
DTE = Data terminal equipment
EIA = Electronic Industries Association
FXO = Foreign exchange, office
FXS = Foreign exchange, subscriber
MIL-STD = U.S. military technical specification
OCU = Office channel unit
PCM = Pulse code modulation
SDM = Subrate data multiplexer
TDM =Time-division multiplexer

This chart includes a representative selection of subrate data muxes. These vendors offer other such products, and vendors not listed may also offer a full range of comparable products.

SOURCE: TELECHOICE, INC., MONTCLAIR, N.J.

(continued from page 35)

handful of vendors make subrate multiplexers that offer both compressed voice and data.

These products support several typical applications. For instance, a retail store chain could use one to mix data traffic such as point-of-sale transaction recording and credit card verification with compressed voice traffic that ties stores into company headquarters or warehouses over a 56K, 64K bit/sec or fractional T-1 circuit.

Another typical use could be to route compressed voice and low-speed data traffic from bank branches into the corporate T-1 or T-3 backbone.

Bank branches usually have data terminal equipment such as automated teller machines and alarm systems that require 9.6K to 19.2K bit/sec of bandwidth. Each branch also requires one or more voice circuits to enable personnel to reach other sites on the private T-1 or T-3 backbone.

The bank's branch managers may not even want to run voice and data at the same time. Instead, they may use three to five voice channels during the day and perhaps transmit data overnight.

This banking application exhibits the subrate multiplexer's ability to pack unused bandwidth on the private net with voice calls when data needs are low. When data needs increase, voice calls can be bumped off the private network and routed across public network services such as a virtual private network or direct-dial long-distance offering.

Subrate muxes can be used to access switched digital services from carriers.

▲▲▲

Subrate muxes can also be used to access switched digital services, such as AT&T's Accunet Switched 56, 64, 384 or 1536 offerings. In order to support transmission of voice and data over sub-T-1 circuits, subrate multiplexers must digitize and compress voice signals.

Typically, voice is digitized at 64K bit/sec using pulse code modulation (PCM). Subrate multiplexers use different modulation methods to compress voice so each call requires less than a full 64K bit/sec circuit. Depending on the modulation method employed, subrate multiplexers can squeeze as many as 13 conversations onto a 64K bit/sec line.

The subrate multiplexers listed in the chart use several standardized voice modulation methods, including PCM; adaptive differential PCM, which digitizes at 16K, 24K or 32K bit/sec; and continuously variable slope delta that digitizes at various rates ranging from 8K to 32K bit/sec.

Most vendors have added some proprietary capabilities to tweak these methods. Some, such

(continued on page 38)

(continued from page 37)

as Ascom Timeplex, Inc., offer both standard and proprietary modulation.

Others, such as Newbridge Networks, Inc., Racal-Datacom, Inc. and Republic Telcom Systems Corp., use only proprietary voice modulation methods, preferring the increased capabilities of their own algorithms that enable a voice call to be transmitted at rates ranging from 4.8K to 32K bit/sec.

The advent of voice compression has been an economic boon for users, who can now get 10 to 13 voice channels on a 64K bit/sec circuit.

▲▲▲

While there are various methods available to reduce the bandwidth needed to support a voice call, one thing is common. The more voice is compressed, the more quality is reduced. For instance, at low-bandwidth rates, users can determine whether a man or woman is calling but cannot detect unique speech patterns that would enable them to identify the caller by name.

As the costs of voice compression came down and quality went up, users expressed increasing interest in it. The gradual liberalization of European post, telegraph and telephone administrations, which has lead to the use of voice compression over data lines, also assisted the growth of the market and the technology.

The advent of voice compression has been an economic boon for users, who can now get 10 to 13 voice channels on a 64K bit/sec circuit. In the past, a T-1 would be required to support that many calls over a single circuit.

Of course, not every voice application is well suited to compression. Voice quality still declines when channels are compressed below 9.6K bit/sec, sometimes to the point where it is unsuitable to use for voice calls outside the corporate network. For most on-network or private calls, however, the quality is adequate.

Talking with others

Besides its voice compression capabilities, a subrate multiplexer's compliance with standards and its interoperability with those devices from other vendors will influence its user appeal.

Users of one vendor's multiplexers, especially those used in a T-1 backbone, are usually concerned that incompatibilities in compression algorithms, rate adaptation schemes and other features will prevent them from building networks consisting of multiplexers from multiple vendors.

With subrate multiplexers, these incompatibilities are not as much of an issue. While differences in proprietary compression and network management systems do exist and cause problems, there are basic de facto industry standards that allow some measure of interoperability between different vendor's products, as well as between one vendor's subrate multiplexer and another's T-1 backbone node.

With subrate multiplexers, the key to interoperability is the rate adaptation scheme that it uses. Rate adaptation enables the multiplexer to stuff multiple low-speed data streams on a high-speed digital circuit and then fill up any unused bandwidth with control data. For example, rate adaptation compresses five 9.6K bit/sec data streams requiring 48K bit/sec of bandwidth and 8K bit/sec of control data on a 56K bit/sec circuit.

Not surprisingly, DDS, the oldest and most established of the rate adaptation methods, is also the most widely supported.

▲▲▲

In the U.S., there are three standardized rate adaptation schemes that will allow most subrate multiplexers to interoperate with each other or with a T-1 backbone node.

The first scheme is AT&T's Digital Dataphone Service (DDS), which includes specifications for transmitting data across digital circuits. The two others are DS0 with a single-rate adapted channel, called DS0-A, and DS0 with multiple channels subrate-multiplexed in DDS format, known as DS0-B. Each of these standards fulfills a different role.

DDS is a long-established digital data transmission service based on a standard set of technical specifications written by AT&T. These specifications enable vendors to build equipment that works with DDS circuits. Therefore, all else being equal, two multiplexers that support DDS transmission should be able to communicate with each other.

DS0-A and DS0-B are local exchange carrier rate adaptation methods that specify the number of subrate channels that can be packed into a 56K bit/sec dedicated circuit.

DS0-A is the accepted method for stacking 9.6K bit/sec channels into a circuit offering 56K bit/sec of usable bandwidth.

DS0-B is actually more popular among subrate mux vendors. It combines 9.6K, 4.8K or 2,400 bit/sec channels onto one 56K bit/sec link. While this method provides more flexibility than DS0-A, it has a drawback.

The way a DS0-B channel is structured, each subframe — the individual 9.6K, 4.8K or 2,400 bit/sec channels — has to operate at the same speed. Thus, if the multiplexer puts one 9.6K bit/sec channel into the DS0-B, all subsequent channels must also operate at 9.6K bit/sec.

Not surprisingly, DDS, the oldest and most established of the rate adaptation methods, is also the most widely supported. Sixteen of the 22 subrate multiplexers in the chart comply with it. DS0-B, which has greater rate adaptation flexibility, is supported by eight of the products in the chart. Five support all three methods.

Internationally, subrate multiplexer vendors use the CCITT X.50 standard for rate adaptation. X.50 is the subrate division scheme for E-1 circuits and is similar to DS0-B.

Three of the multiplexers listed in the chart — Advanced Compression Technology, Inc.'s SDM-T Multiplexer, Frame Relay Technologies' FrameMux 600VX and RAD Data Communications' KiloMux 2000 — offer X.50 capability.

(continued on page 40)

Inverse, subrate muxes: similar yet different

Much has been written recently about inverse multiplexers, which spread high-speed data signals across multiple, lower speed, dial-up digital circuits. One might be tempted to call these products subrate multiplexers, which also utilize wide-area circuits that operate below T-1 speed.

However, inverse muxes are indeed different from their subrate cousins. While both classes of product multiplex, they perform their functions in opposite ways.

Bandwidth on demand is another term that is coming to be associated with subrate muxes.

▲▲▲

An inverse mux accepts a high-speed data stream from data terminal equipment and spreads it over multiple, slower speed wide-area circuits. At the receiving end, another inverse multiplexer reorganizes the information by reassembling data from those circuits into a single stream.

Subrate multiplexers take in several low-speed data streams and merge them onto a high-speed wide-area circuit. The receiving subrate mux breaks that high-speed data stream back into low-speed data streams.

Technically, inverse multiplexers perform what could be considered a form of multiplexing, by combining multiple carrier circuits into a single application data stream. But that is the inverse of what a normal multiplexer does — hence, the name inverse multiplexer.

There has been a recent boom in the types and numbers of customer premises equipment using inverse multiplexing technology.

A year ago, only three major manufacturers — Ascend Communications, Inc., Digital Access Corp. and Teleos Communications, Inc. — made inverse multiplexer equipment.

Today, more than a dozen vendors make these muxes, with about six more expected to announce products later this year.

Recent inverse multiplexer product announcements include Larse Corp.'s Diversi-T Diversified Network Access Multiplexer and Teleos' NetworkHub and VideoHub lines of customer premises-based access hubs, which provide inverse multiplexing and connectivity between most carriers' digital services.

Ascend is expected to announce similar products within the next several weeks.

Bandwidth on demand is another term that is coming to be associated with subrate multiplexers. Loosely speaking, bandwidth on demand refers to the ability of inverse multiplexers — such as those from Ascend, Digital Access and Teleos — to dial up multiple 56K or 64K bit/sec channels from a carrier's point of presence (POP).

In this manner of using subrate digital channels to provide communications links, they again resemble subrate multiplexers.

However, these inverse muxes perform a different function than do subrate multiplexers. They sit between the carrier's POP and the user network, working only with switched digital services.

Inverse muxes perform a different function than do subrate multiplexers.

▲▲▲

In contrast, subrate multiplexers typically are wholly contained within the private user network. There is no reason, however, why a subrate multiplexer could not be used behind an inverse multiplexer, combining multiple inputs onto one or more 56K/64K bit/sec links to the inverse mux, which then dials up the necessary channels from the carrier's POP.

— *Bruce Guptill*

VINES® now available for 5, 10, or 20 users!

Nightmare Scenario #2

THE RUNAWAY CASH SUCKER.

"Why didn't someone tell me this @$!?& network would cost so much?"

A lot of executives go pale when they see how much their computer networks are really costing them.

"What's with all this new payroll?" they ask. "I thought this thing was going to save us money."

Too late. They're strapped to a runaway cash sucker and heading downhill fast.

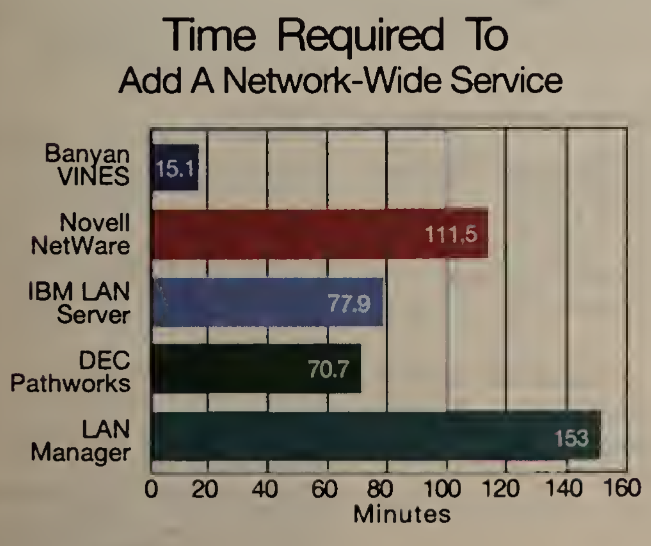
The fact is, the real economics of running a computer network are never even mentioned by the people trying to sell you one.

And not knowing can cost you plenty.

Research proves Banyan more cost-effective than Novell, IBM, DEC and Microsoft.

Which brings us to the research report offered free on this page.

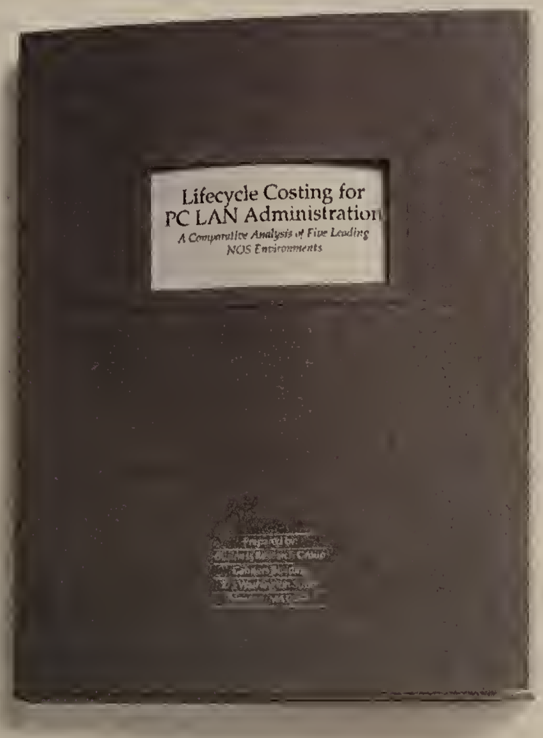
It was compiled by the Business Research Group, and shows how Banyan,® Novell,® IBM,® DEC,® and Microsoft® stack up against each other in cost of operation.



Business Research Group/Newton, MA bc16D

For sheer cost-effectiveness, Banyan surpasses everyone.

What BRG did was to interview the day-to-day LAN managers at 180 different organizations about the length of time required to execute 11 typical network functions.



Send for this impartial survey of network cost-efficiency. It's full of hard, actionable data.

Banyan won in all 11 categories. Often by astounding margins.

Whatever the job, administrators of Banyan VINES® networks were able to do them faster.

And faster translates into smaller staffs and lower cash outlays.

Banyan won across the board because our unique integrated architecture greatly simplifies administration. With Banyan VINES, cost-efficiency is built in from the beginning.

Computer networks are rapidly becoming indispensable to business. So understanding the true cost of networking is now critical.

The BRG report is a good place to start. This is a real-world report based on the testimony of actual network managers.

Banyan is the world leader in simplifying the use and management of networks—and we can show you why.

For your free copy of the BRG report, and/or a VINES 5, 10, and 20 brochure, call 1-800-828-2404.

Please send this coupon to: BANYAN,
120 Flanders Road, Westboro, MA 01581
1-800-828-2404.
Check one or both:
☐ BRG report
☐ VINES 5, 10, and 20 brochure

NAME

TITLE

COMPANY

ADDRESS

CITY STATE ZIP

PHONE

NW413

BANYAN®
Networking. Without Limits.™

(continued from page 38)

Most subrate mux vendors support the standard rate adaptation schemes. A multiplexer that does not conform to at least one of these basic standards is unlikely to be popular with users because its connectivity options will be severely limited.

Another reason for this development pattern is that standards for subrate multiplexing were set by AT&T before divestiture. Because these standards are ingrained and efficient enough, vendors largely have stuck with them over the years.

However, many subrate multiplexer vendors have equipped their products with features that add some sort of value beyond interconnectivity with 56K or 64K bit/sec circuits.

For example, Newbridge Networks' 3606 Mainstreet Little Mux subrate multiplexer allows a combination of subrates in a single 64K bit/sec circuit — a proprietary extension of DS0-B functionality.

Rate adaptation is not the only important factor in selecting a subrate multiplexer.

▲▲▲

The importance of ports

Rate adaptation is not the only important factor in selecting a subrate multiplexer. Generally, users want as many input and output ports as they can get to satisfy current needs as well as future network expansions.

Bayly Communications' Omniplexer gets the nod for most input ports — an impressive maximum of 480. However, this is because the Bayly unit possesses some characteristics of a T-1 multiplexer, with the capability of T-1 inputs and outputs and a total of 32 outputs.

Among the others, the number of input ports varies widely. Several vendors offer eight ports, while on the high end, Data Race, Inc.'s Mach DS 64 supports as many as 64 ports.

However, that unit also is priced higher than the average subrate multiplexer — a cost of $13,500 vs. $4,100 for the 32-port AXXESS/1 from Dataproducts New England, Inc.

On the output side, most vendors offer a single composite link. The exceptions are the Bayly unit, with 32 composite links, and the Data Race box, with a maximum of 20. These links usually have an aggregate range of between 64K and 384K bit/sec. A few, such as the FrameMux 600VX and Gandalf Systems Corp.'s Infotron 2120, offer T-1 capacity over a single aggregate link.

Other features

Subrate muxes also support a mix of other features that are important to users.

Gandalf and Micom Communications Corp., for instance, sell subrate multiplexers with Ethernet interfaces that enable users to transmit LAN traffic over subrate circuits. This feature is being added as LAN connectivity becomes a major use of corporate backbone networks.

The need to link LANs is also spilling over to the public network, fueling the development of such carrier services as frame relay, as well as the use of multiple switched 56K/64K bit/sec and switched T-1 services with inverse multiplexers (see "Inverse, subrate muxes: similar yet different," page 38).

Facsimile traffic is also becoming more important, particularly among large corporations with several offices. As a result, more and more vendors are including Group III fax interfaces in their subrate multiplexers. Advanced Compression Technology, Data Race, Frame Relay Technologies, Micom, Pacific Communications Sciences, Inc. and RAD Data Communications offer this feature.

Industry experts expect to see more card-based subrate multiplexers before year end.

▲▲▲

Some users may require a subrate multiplexer that is capable of distributing network operations and control software to other multiplexers on the network, a process called downline software loading.

Only two of the subrate multiplexers listed in the chart, the AXXESS/1 and General DataComm, Inc.'s Kilomux 1291, currently include such a capability.

However, as the subrate multiplexer market matures, more subrate mux vendors are expected to add this feature. This is extremely useful to users desiring more centralized network control and management capabilities.

Some vendors are beginning to offer card-based products that enable T-1 multiplexers to act as subrate multiplexers. Users simply install a subrate mux board into a T-1 multiplexer chassis to provide subrate multiplexing in a single slot.

Subrate muxes are making a comeback, mostly due to the inclusion of new features.

▲▲▲

The main benefit of these cards is that they increase the T-1 mux's connectivity options without adding more equipment to the communications center. Coastcom, Inc.'s SDM card for the D/I Mux III is the only such product listed in the chart, but other vendors have similar devices under development. Industry experts expect to see more card-based subrate multiplexers from major vendors before year end.

Based solely on the features categories listed in the chart, users seeking the top subrate multiplexer for their money should investigate the offerings of General DataComm, Dataproducts New England, RAD Data Communications and Republic Telcom. These four vendors provide an excellent mix of operating rates, inputs, interfaces, features and relatively low prices. In its AXXESS/1 product, Dataproducts New England also includes one of the more leading-edge capabilities — downline software loading.

Astrocom Corp., Newbridge Networks, Network Equipment Technologies, Inc., Pacific Communications Sciences, Racal-Datacom and Telemax Corp. all provide subrate multiplexers that have fewer advanced features.

In conclusion

Subrate multiplexers are making a comeback, due in large part to the inclusion of new features such as the addition of voice modulation to pack calls onto the same circuit that supports data traffic.

At the same time, vendors have begun to migrate features usually reserved for high-end multiplexers down to their subrate mux lines. Users can now obtain subrate muxes that offer LAN support, in addition to traditional support for terminal traffic.

This blurring of distinction between subrate muxes and their higher end cousins will continue, making it attractive for users to combine outbound traffic onto a single link, rather than maintaining separate lines for voice and data traffic.

The upshot is that subrate multiplexers are no longer just smaller, less functional versions of T-1 muxes. They are full-featured products that play an integral role in users' networks.

Guptill is an associate with TeleChoice, Inc., a Montclair, N.J., consultancy specializing in strategic planning and analysis of intelligent networks, services and applications. He can be reached at (201) 746-0200.

Letters

continued from page 33

Today's regulatory process is not serving the needs of users. It is, in fact, harmful to them and their ability to compete in global markets.

The time has now come for federal regulators to remind themselves that users — not suppliers — are their primary constituents.

What users think does matter. And what they think of today's process is that it needs to get out of the way of real competition. And real competition, unencumbered by antiquated regulatory requirements, will force all competitors — including AT&T — to be more responsive to users' needs.

In an unregulated environment, competitors, including AT&T, will sometimes be the winners and other times be the losers; but users will always be the winners.

William Catucci
Vice-president of
government affairs
AT&T
Basking Ridge, N.J.

Network World Advertising
Sales Offices

NATIONAL SALES MANAGER
Don F. Mahlmeister
(708) 297-8855/FAX: (708) 827-9159

BOSTON
Donna Pomponi, District Manager
Eleni Brisbois, Sales Assistant
161 Worcester Road, Framingham, MA 01701
(508) 875-6400/FAX: (508) 651-1853

NEW YORK/N. NEW JERSEY
Joan Daly, Eastern Regional Manager
Marlene Levis, Sales Assistant
365 W. Passaic St., Rochelle Park, NJ 07662
(201) 587-0090/FAX: (201) 712-9786

S. NEW JERSEY/PHILADELPHIA/D.C.
Jacqueline Mita, District Manager
Marlene Levis, Sales Assistant
365 W. Passaic St., Rochelle Park, NJ 07662
(215) 834-1390/FAX: (201) 712-9786

CHICAGO
Dan Gentile, District Manager
Kathy Mazzie, Sales Assistant
10400 West Higgins Rd., Suite 300
Rosemont, IL 60018
(708) 297-8855/FAX: (708) 827-9159

SAN FRANCISCO
Chris Curry, Western Regional Manager
Sandra Kupiec, District Manager
Lonnie Forbes, Sales Assistant
Beverly Davis, Sales Assistant
2083 Landings Drive, Mountain View, CA 94043
(415) 691-0510/FAX: (415) 691-0525

ATLANTA
Don Seay, District Manager
Beth Juren, Sales Assistant
1400 Lake Hearn Dr., Suite 330, Atlanta, GA 30319
(404) 394-7509/FAX: (404) 255-5123

LOS ANGELES
Richard Carlisle, District Manager
Karen Silverstein, Sales Assistant
18008 Sky Park Cir., Suite 145, Irvine, CA 92714
(714) 250-3006/FAX: (714) 250-4881

**RESPONSE CARD DECKS/ACTIONCENTER/
NETWORKING MARKETPLACE**
Joan Bayon Pinsky, Sales Director
Clare O'Brien, Acct Mgr, ActionCenter Response Cards
Shannon Summers, Account Executive, Marketplace
Eleni Brisbois, Sales Assistant
(508) 875-6400/FAX: (508) 651-1853

RECRUITMENT ADVERTISING
William Reinstein, National Sales Director
Pam Valentinas, Eastern District Manager
Christie Sears, Sales Assistant
(508) 875-6400

ADVERTISING OPERATIONS
Karen Wallace - Manager of Advertising Operations
Linda Miller - Senior Account Coorinator
Cathy McPherson - Advertising Coordinator
Barbara Hill - Classified Account Supervisor
(508) 875-6400

NETWORK WORLD, INC. - An IDG Company

161 Worcester Road, Framingham, MA 01701
(508) 875-6400/FAX: (508) 879-3167

Colin Ungaro - President/Publisher
Mary Fanning - Dir. of Financial Operations
Nanci Farquharson - Adm. Assistant

MARKETING
Evilee Thibeault - Vice President Marketing
Carol A. Leonard - Marketing Specialist/Events
Julianne Jeremiah - Mktg. Specialist/Promotion

RESEARCH
Ann MacKay - Research Manager

CIRCULATION
Richard Priante - Director of Circulation
Renee Visconti - Fulfillment Manager
Bobbie Cruse - Customer Service Rep.
Edna Clifford - Circulation Assistant

PRODUCTION
Ann Finn - Production Director
Cheryl Rothman - Senior Production Coordinator
Anne Rosenkranz - Imaging Manager
Terri Mitchell - Production Assistant
FAX: (508) 875-3090

REPRINTS
Donna Kirkey - Reprint Coor./Graphic Designer

LIST RENTAL SERVICES
Andrew Samhrook - List Rental Sales
P.O. Box 9151, Framingham, MA 01701-9151
(508) 879-0700

INFORMATION SERVICES
Jeff Pennett - Director of Info. Services
Jack McDonough - Manager of Info. Services

DISTRIBUTION
Bob Wescott - Distribution Manager
(508) 879-0700

IDG

Patrick J. McGovern - Board Chairman
Walter Boyd - President
William R. Murphy - Vice-President Finance
Robert Farmer - Vice Chairman

Network World is a publication of IDG, the world's largest publisher of computer-related information and the leading global provider of information services on information technology. IDG publishes over 150 computer publications in more than 50 countries. Thirty million people read one or more IDG publications each month. IDG contributes to the IDG News Service offering the lastest on domestic and international computer news.

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS MAIL PERMIT NO. 339 LARGO, FL

POSTAGE WILL BE PAID BY ADDRESSEE

AT&T PARADYNE
LH-107
8545 126TH AVE. N.
P.O. BOX 2826
LARGO, FL 34649-9852

CSU/DSU
COMPUTERWORLD
1992
IS BRAND PREFERENCE

Put AT&T Paradyne's winning team to work for you.

Call **800 482-3333, Ext. 539**, complete and mail this card today, or FAX it to **813 530-2103**.

____ Yes, I'd like to know how my company can take advantage of AT&T Paradyne's expertise in hybrid networking.

My networking needs are: ____ Implementing a T1-based networking strategy ____ Migrating from analog to digital service
____ Other (Please specify)____________________

____ Send me more information on the products and services that won these awards.

Name ____________________
Title ____________________
Company ____________________
Address ____________________
City ____________ State ______ Zip ____________
Telephone (________) ____________________

AT&T Paradyne

A B

AT&T Paradyne won 1st place in 9 out of 10 CSU\DSU and T1\T3 categories.

CSU/DSU
COMPUTERWORLD
I/S BRAND PREFERENCE
1 9 9 2
BEST TECHNOLOGY

CSU/DSU
COMPUTERWORLD
I/S BRAND PREFERENCE
1 9 9 2
BEST PRICE/PERFORMANCE

CSU/DSU
COMPUTERWORLD
I/S BRAND PREFERENCE
1 9 9 2
PREFER TO DO BUSINESS WITH

CSU/DSU
COMPUTERWORLD
I/S BRAND PREFERENCE
1 9 9 2
BEST SERVICE/SUPPORT

CSU/DSU
COMPUTERWORLD
I/S BRAND PREFERENCE
1 9 9 2
BEST DOCUMENTATION

T1/T3 MULTIPLEXERS
COMPUTERWORLD
I/S BRAND PREFERENCE
1 9 9 2
BEST TECHNOLOGY

T1/T3 MULTIPLEXERS
COMPUTERWORLD
I/S BRAND PREFERENCE
1 9 9 2
PREFER TO DO BUSINESS WITH

T1/T3 MULTIPLEXERS
COMPUTERWORLD
I/S BRAND PREFERENCE
1 9 9 2
BEST SERVICES/SUPPORT

T1/T3 MULTIPLEXERS
COMPUTERWORLD
I/S BRAND PREFERENCE
1 9 9 2
BEST DOCUMENTATION

For a cost-efficient hybrid networking strategy,
call the winning team today.

800 482-3333, Ext. 539

AT&T Paradyne

Send For Free Info

NW Apr 92

For more information on any of the products and services advertised in *Network World's ActionCenter,* circle the Reader Service Numbers on this coupon which correspond to the advertisements of interest to you.

Complete the coupon information and mail to: ***Network World***
P.O. Box 5090, Pittsfield, MA 01203

Name ____________________
Title ____________________
Company____________________
Phone ( ) ____________________
Street ____________________
City ____________________
State ____________________ Zip ____________________

NW Apr 92

1	2	3	4	5	6	7	8
9	10	11	12	13	14	15	16
17	18	19	20	21	22	23	24
25	26	27	28	29	30	31	32
33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48
49	50	51	52	53	54	55	56

Expires 7/31/92

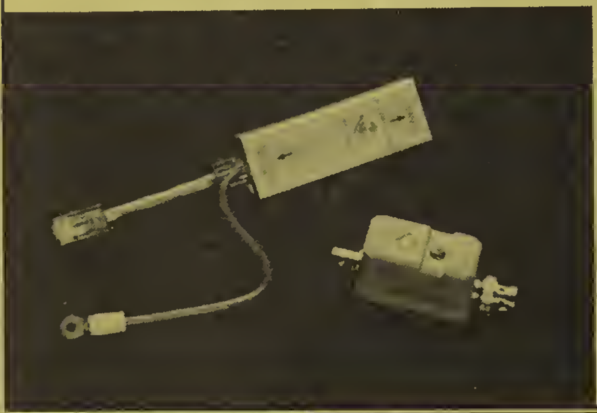
3-STAGE LAN PROTECTION

BRAVO SURE/FIRE® LAN PROTECTORS ➔ Only $59

③ STAGE ETHERNET, ARCNET, TOKEN RING & STARLAN PROTECTION GUARANTEES LAN PERFORMANCE & INTEGRITY

Model BNC / LAN: Protects Ethernet/ThinNet, ARCNET & Token Ring ports.
Model RJ45 / LAN: Protects Twisted-Pair Ethernet (10-Base T) & ARCNET ports.

GSA Contract Number
GS00K91AGS5224 PS01



• Protects network adaptor cards, repeaters, fanouts, transceivers, multiplexers, hubs, concentrators, and related equipment. • Stops LAN degradation and failing LAN components. • Eliminates costly LAN downtime and repairs. • A Red-Diamond LAN Protection Light displays LAN protection status for troubleshooting.

Made in U.S.A.

BRAVO COMMUNICATIONS, INC.
1310 Tully Road, Ste. 107
San Jose, CA 95122
1-800-366-0297
FAX: (408) 297-8701

Circle Reader Service No. **18**

DATACOMM MATRIX SWITCH

DISASTER PROTECTION DESIGNED INTO THE *MTRX* TANDEM MATRIX SWITCH

THE STANDARD MTRX OFFERS 3-WAY PROTECTION AGAINST LOCALIZED DISASTERS SUCH AS FIRE, WATER, POWER, OR EQUIPMENT FAILURE

1 Separate	MTRX Tandem Matrix Switch Assemblies in different parts of your building
2 Distribute	MTRX Satellites up to 8 miles from each other
3 Connect	MTRX Satellites to the MTRX Tandem Matrix Switch Assemblies over dual, diversely routed Twisted Pair or optical fiber cables

Plus take advantage of these other MTRX BENEFITS

- •Largest Non-Blocked Port Capacity...8192 PORTS
- •Up To 98% Data Cable Reduction DTE to DCE
- •4000 FT DTE to DCE With Twisted Pair Cable
- •8 miles DTE to DCE With Optical Fiber Cable
- •LAN Based PC Control - Ethernet Or Token-Ring
- •Multi-tasking (VM-386) Universal Workstation
- •Integral BERG/BERT Test Functions
- •Non-Proprietary Database, dBASE III PLUS/dBASE IV
- •Supports Data Rates To 2.048MBPS

MTRX-500	512 Ports
MTRX-4000	4096 Ports
MTRX-8000	8192 Ports

Over 50,000 Ports Installed At RBOCs, Government, and Fortune 1000 Companies

Call us Today to Discover the *NEW DIMENSIONS* in Network Management Technology With the *MTRX* Family of *TANDEM* Electronic Matrix Switches

Datacomm
Management
Sciences Inc.

"The Responsive Ones"

Circle Reader Service No. **1**

25 Van Zant Street
East Norwalk, CT 06855
TEL: (203) 838-7183

dBASE III PLUS/dBASE IV are trademarks of Ashton-Tate Corporation

AUTOMATIC SWITCHING

BACK-UP OR SHUT-UP!!

Automatic Switching Systems Restore Communications Using Dial Lines or Redundant Leased Circuits. If Your Business Sends Data, Dataprobe's Backup Systems Will Help Mind It! We Specialize in Data Communication Backup, Remote Switching and Alarm Reporting Systems.

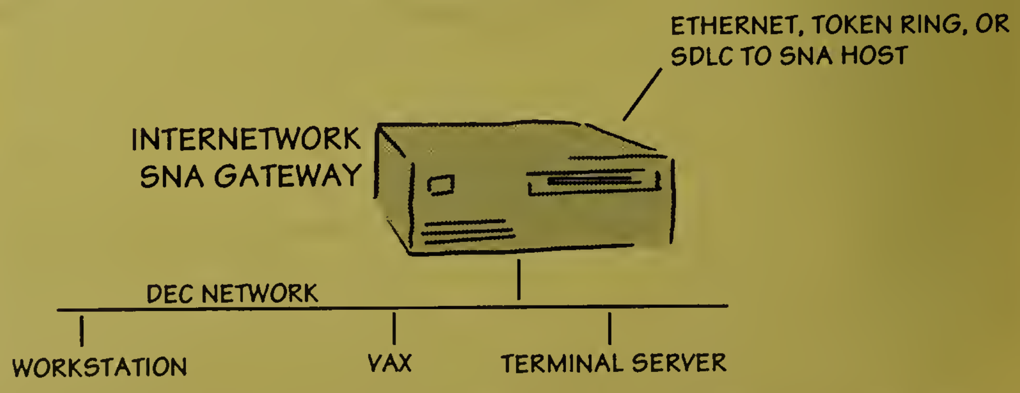
dataprobe

170 Coolidge Avenue / Englewood, NJ 07631
Phone: 201-569-6464 Fax: 201-894-0939

Circle Reader Service No. **25**

DEC-TO-IBM

SNA Host Access For LAT-Attached DEC Terminals



With Netlink's Internetwork SNA Gateway™, LAT-attached DEC terminals and printers can access SNA host applications and operate as full-function 3270 devices. Reduces costs while maximizing network flexibility...Eliminates parallel networks...Supports from 16 to 128 SNA sessions...Connects to IBM hosts via SDLC, token ring, or ethernet...Requires no VAX resources!

Call 1-800-NETLINK to learn more!

Circle Reader Service No. **2**

NETLINK INC.

FRACTIONAL T1 DSU/CSU

High-Speed LAN to WAN Connectivity

Multiplexing reduces your equipment and access costs, allowing you to economically interconnect LANs and WANs, network CAD/CAM systems, implement video teleconferencing and link various mainframes and hosts.

Digicom's fractional T1 DSU/CSU offers:

- 2 DTE ports expandable to 6
- DS1 port (drop and insert option)
- ESF or D4 selectable framing
- V.35, RS449 and EIA 530 interfaces to DTE
- Supervisory/printer port

Call today for more information:

1-800-833-8900

DSI

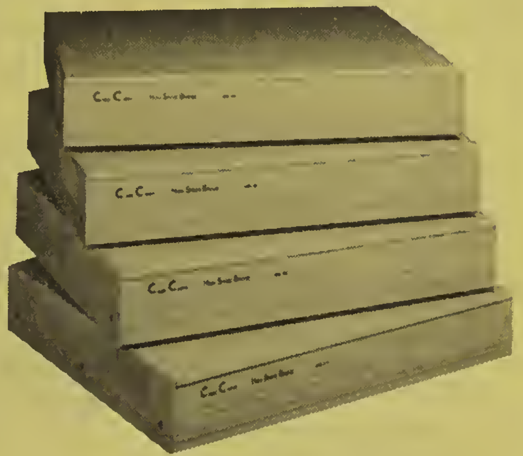
Digicom Systems, Inc.
188 Topaz Street
Milpitas, CA 95035-5429

Circle Reader Service No. **3**

LAN/WAN INTERNETWORKING

High-Speed Ethernet/Token Ring Bridges

from CrossComm



CrossComm's HSB High Speed bridging products for both local and remote Ethernet/Token Ring LANs offer:

- Low cost
- Ease of installation
- Self-learning
- Protocol transparent
- Destination and source filtering
- Spanning Tree protocol
- Comprehensive Network Management

Call CrossComm at

1-800-388-1200 x100

and get connected!

CrossComm Corporation
140 Locke Drive • Marlboro, MA 01752

Circle Reader Service No. **15**

LAN CONNECTIVITY

ETHERNET LAN BUILDING BLOCKS

10BaseT • 10Base2 • 10Base5 • FOIRL•

ALL YOU NEED TO CONNECT ETHERNET LANS

- **Transceivers**
- **Repeaters**
- **Hubs**

- **Coax**
- **Twisted Pair**
- **Fiber**
- **Multi-media**

• Plug and Play • VLSI in Steel • Made in the USA •

Netcor, Inc.
850 Auburn Court
Fremont, CA 94538

Netcor
ON LINE CONNECTIVITY

Tel: (510) 623-3700
Fax: (510) 623-3717
Outside CA: (800) 531-1300

Circle Reader Service No. **16**

LEASE LINE BACKUP

Is Your Back Up Modem Running Up Your Phone Bill?

The Inhibitor—CDI's Bill Saver—Is the Answer

Users report the Inhibitor can pay for itself in as quickly as Three months! And it goes on saving money, month after month.

The Inhibitor prevents fallback switches and backup modems from accessing telephone lines during pre-programmed times of the day or days of the week. The Inhibitor is vendor independent, and works with any dial up equipment.

And the Inhibitor not only saves money directly; it generates status and history reports that make it easy for the system manager to optimize the dial-up network.

To learn more about reducing your phone costs, contact CDI today.

CDI

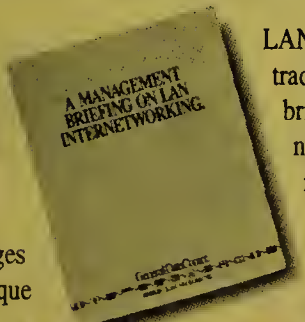
Communication Devices Inc. • 1 Forstmann Ct. • Clifton, NJ 07011
Phone 201/772-6997 • Fax 201/772-0747 • 800/359-8561

Circle Reader Service No. **5**

LAN INTERNETWORKING

FREE MANAGEMENT BRIEFING ON LAN INTERNETWORKING.

Interested in a new approach to LAN internetworking? Get this special General DataComm report on LAN Transport Management.™ This paper describes the advantages and disadvantages of traditional bridges and routers, and introduces a unique new approach from GDC.



LAN Transport Management offers traditional routing where required, bridging where desirable - and a new capability that provides routing, independent of all protocols, plus completely open network management. For your free copy, call 1-800-777-4005.

See us at Texpo '92 Booth 619

General DataComm

WORLD CLASS NETWORKING

WORLD HEADQUARTERS 1-203-574-1118 HONG KONG 852-526-5511 CANADA 1-416-498-5100 AUSTRALIA 61-2-956-5099
UNITED KINGDOM 44-734-774868 EUROPE, AFRICA, MIDDLE EAST HEADQUARTERS 33-1-30570200 JAPAN 81-33-862-1730

Circle Reader Service No. **4**

LIST RENTAL

Your Key to Target Marketing

The Network World Subscriber List

Over 300 selection options...

- The key to better selectivity
- The key to prequalifying your list
- The key to a better return on your investment
- The key to a successful direct mail campaign

Call 800-343-6474, x202 for details

IDG Communications List Services

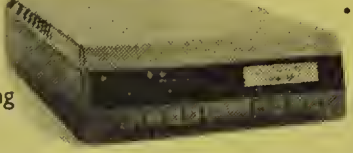
NETWORK WORLD

MODEMS

Teleglobe's V.32bis Modem.

Gets more out of your phone line
and less out of your wallet.

Teleglobe's DA 3214 Modem is one of the best performing units on the market today. Because of custom DSP technology, the DA 3214 connects and holds maximum line speeds for ultimate speed and reliability—even under adverse line conditions. Making connections faster and more efficient.



- Features a line rate of 14.4 kbps over standard phone circuits, and a maximum throughput of 57.6 kbps using V.42bis compression.
- Compatible with EMS 900 Dial Network Management System.
- Supports four-wire lease line applications with automatic single call dial backup.
- Compact design with liquid crystal display and front panel controls for easy configuration and monitoring.
- Backed by Teleglobe's 20 years of communications experience.

For more information, contact Teleglobe today at 1 800-926-3225 ext. 3200, or contact us by fax at 1 508-681-0660.

TELEGLOBE
Communication Products

Circle Reader Service No. **17**

MULTILINE DSU/CSU'S

TODAY YOUR APPLICATIONS DEMAND MUCH MORE FROM YOUR T1 DSU/CSU

Introducing the ConnecT1 Plus from **VERILINK**

More Performance, More Flexibility,
More Advantages including:

* Access to T1, Fractional T1 and Virtual Private Networks
* Drop and Insert
* 2 Ports Expandable to 6
* Supports up to two T1 lines
* Continuous, Full Network T1 Performance Monitoring
* Network Management

Call Us Today Toll-Free at
1-800-669-4278
For Your ***FREE*** Verilink Planning Kit

The Helfrich Company
19782 MacArthur Blvd, Suite 310
Irvine, CA 92715

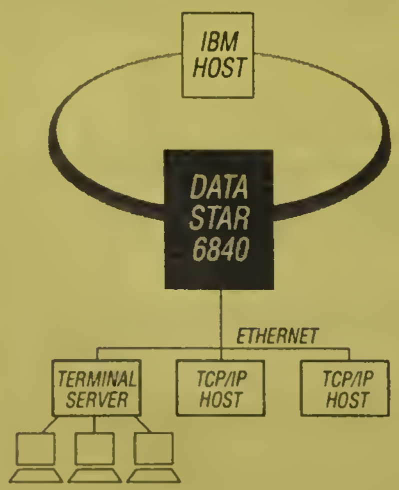
VERILINK

Circle Reader Service No. **6**

MULTI-PROTOCOL GATEWAYS

The Apertus 6840 Telnet Server. Your Link To The IBM 3270 World.

The Apertus 6840 Telnet Server is a unique system that transparently connects TCP/IP-based LAN users with IBM® host applications. Special features of the 6840 include:



- 1000 sessions per system
- BSC host support
- ASCII host support
- NetView® and SNMP support
- Comprehensive system administration and control

To find out more, call Apertus Technologies at 1-800-328-3998, extension 33.

APERTUS®

IBM and NetView are registered trademarks of International Business Machines.

Circle Reader Service No. **7**

PROTOCOL ANALYZER

Frame Relay Testing on your PC

Free Demo Disk

- ▲ 9415 fits into 1/2 card slot.
- ▲ Simultaneous data decodes and statistics for **Frame Relay/SNA/X.25/ ASYNC /BISYNC at 256 kbps.**
- ▲ Half duplex BERT.
- ▲ Intelligent traps.
- ▲ Compatible with all 9400 Dedicated Analyzers.
- ▲ User friendly.

Try us out–call for your free demo disk today!

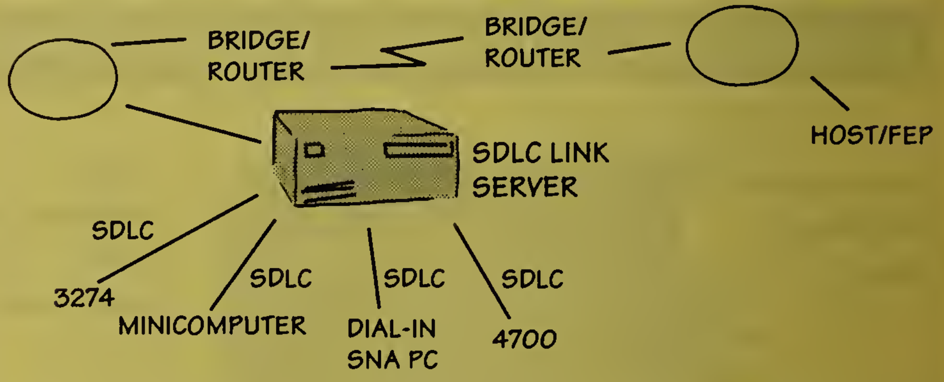
GN Navtel

Call toll free in the USA: 1-800-262-8835
6611 Bay Circle, Suite 190, Norcross, GA 30071
or call 404-446-2665

Circle Reader Service No. **19**

SNA INTERNETWORKING

A Better Way For SNA - Across Your Internetwork!



Netlink's SDLC Link Server™ connects Node Type 2.0/2.1 devices to a token ring or ethernet LAN, enabling the transport of SNA data across a bridge/ router-based internetwork. Reduce costs while improving network efficiency! Merge parallel networks...Eliminate SDLC lines...Conserve front end processor ports...Improve response times...With full support for IBM's NetView!

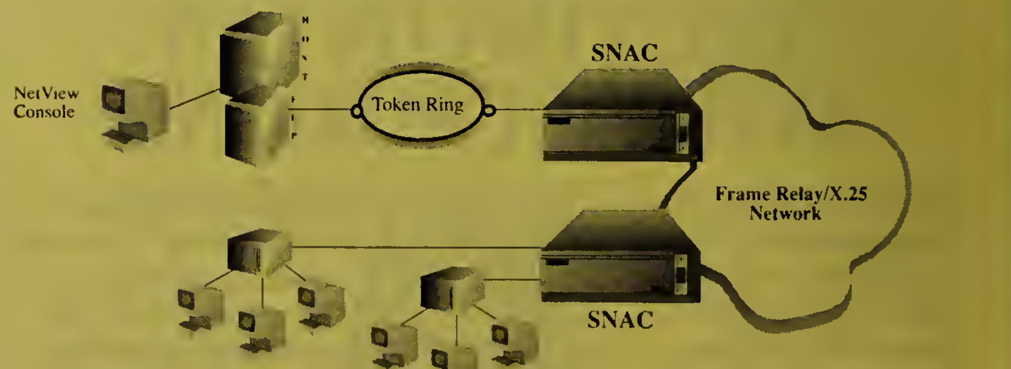
Call 1-800-NETLINK to learn more!

NETLINK INC.

Circle Reader Service No. **8**

SNA NETWORK ACCESS CONTROLLERS

From Token Ring To Frame Relay Access, Your SNA Controllers Can Have It All



Sync Research's **SNAC** product family puts your IBM terminal users on the "New SNA" network. You can network your controllers using the high performance economics of **Frame Relay** or **X.25**.

Visible to NetView, the **SNAC** maintains downstream controllers and puts monitoring and control in the hands of NetView operators. You can save money on facilities while streamlining your network management.

Call **1-800-ASK-SYNC**

SYNC RESEARCH
InterNetworking SNA

Circle Reader Service No. **9**

SWITCHED 56

How to use Switched 56 for...

- Backing up DDS lines
- Backing up critical T-1 channels
- Dial-up access to digital networks

Switched 56 has become a readily available and cost effective service. It offers simple, dial-up access to the growing world of digital networks. To access it, you need a Switched 56 "modem", a low cost device called a TIU (Terminal Interface Unit) or DU (Data Unit).

Dowty Communications makes these TIUs and DUs. The literature describing them includes explanations of six different applications with "how to" illustrations. There's also information on speed conversion (your input does not have to be 56 Kbps), automatic dialing and automatic switchover.

For more information on Switched 56 and on the Dowty DCP3058 TIU and DCP3060 DU, call 800-227-3134 or write Dowty Communications, Cherry Hill Industrial Center, Cherry Hill, New Jersey, 08003.

Dowty Communications
Formerly CASE/Datatel

DOWTY

Circle Reader Service No. **10**

SWITCHING & PATCHING

CONNECT WITH Spectron SWITCH/PATCH

There's no better value than Spectron for on-line monitoring, test access, network reconfiguration, and A/B switching.

Features include:

- Universal chassis that permits intermixing of interfaces
- Integral audible and visual alarms
- Remote monitoring, switching and alarming

For more than twenty years network managers have been entrusting their network connections to Spectron switching and patching products. In data centers throughout the world, Spectron products have proven themselves reliable over millions of hours use and countless operations.

To get more information about Spectron switching and patching products, call or write

Call 1-800-222-0187

TELENEX CORPORATION
A UNIT OF GENERAL SIGNAL

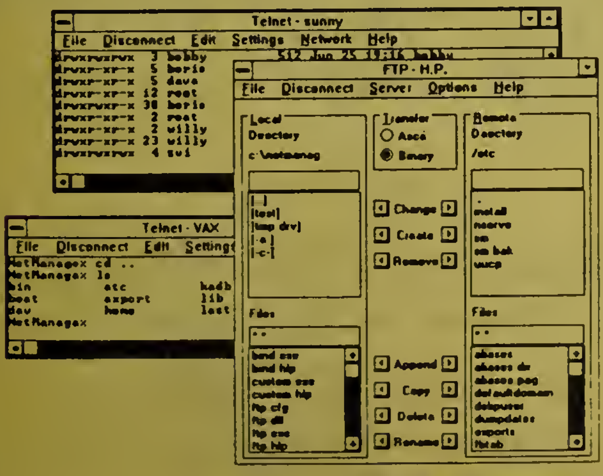
Spectron Tech Control Products
13000 Midlantic Drive
Mount Laurel, NJ 08054

Circle Reader Service No. **14**

TCP/IP NETWORKING

TCP/IP for Windows 3.0

Chameleon is the first TCP/IP communications package developed specifically for Windows 3.0 (not converted from DOS), allowing multiple concurrent sessions with different accounts and hosts. **Chameleon** is the first TCP/IP applications package in the market implemented as a Windows Dynamic Link Library (DLL) and not a TSR, saving precious 640K base memory.



Applications:

TELNET (VT100)	
FTP	BIND
TFTP	Statistics
SMTP	Custom
Mail	PING

(408) 973-7171

Net*Manage*

NetManage Inc.
20823 Stevens Creek Blvd.
Suite 100
Cupertino, CA 95014
Fax: (408) 257 6405

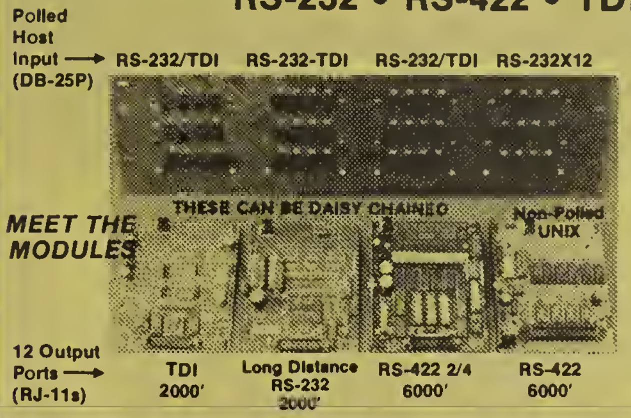
Circle Reader Service No. **11**

TERMINAL CONNECTIVITY

CPS P-CON 48 PATCH PANEL CONVERTER

THE FLEXIBLE TWISTED PAIR CABLING SYSTEM FOR POLLED AND NON-POLLED TERMINAL NETWORKS

RS-232 • RS-422 • TDI (Unisys)



- Use Same Topo for Future LANs
- Modular 12-48 Ports per Panel
- Add 12 Port Modules as Needed
- Each Port is Separately Regenerated
- Transparent to Data Rates to 115 KB
- LEDs and Audible Streaming Alert
- Mix and Match Modules on the Same Panel
- Fits Standard 19" Rack
- Stand Alone 12 Port Version Also Available
- Terminal End Converters and Boosters for Extra Long Cable Runs Are Available

Average $50 Per Port
Beats the SR Modem Approach

Circle Reader Service No. **20**

The Snap On MODULES Provide the Signal Disciplines that You Need to Turn Your Passive Cabling System into an Active Long Distance Twisted Pair System.

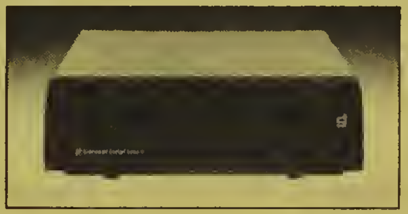
ALSO
- Modem Sharing
- Fiber Optic Conv
- Port Sharing
- Dialer Products

Computer Peripheral Systems
P.O. Box 98282
Atlanta, Georgia 30359

Phone: 1-800-888-0051
(404) 908-1107
Fax: (404) 908-1208

UNIVERSAL DSU

DATACOMM 500G/UXR. THE UNIVERSAL DSU FOR WORLDWIDE NETWORKS.



Our new DSU offers universal rates from 2.4 to 64 Kbps. Supports secondary channel and "clear channel." Automatically selects rate and mode of operation. Provides extended range operation over DDS, generic digital services, or FT-1. Standalone or rackmounted, it's the one product to buy. Call 1-800-777-4005.

See us at Texpo '92 Booth 619

General DataComm

WORLD CLASS NETWORKING

CORPORATE / INTERNATIONAL HEADQUARTERS 203-574-1118 HONG KONG 852-526-5511 CANADA 416-498-5100
AUSTRALIA 61-2-956-5099 UNITED KINGDOM 44-734-774868 FRANCE 33-1-30570200 JAPAN 81-33-862-1730

Circle Reader Service No. **12**

VOICE/DATA/FAX MULTIPLEXER

DATA RACE Announces Multiplexer Breakthrough

NEW Voice/Fax/Data Multiplexer saves end-users tens of thousands of dollars

By Paul Longoria

SAN ANTONIO, Texas — If you can say yes to the next two questions then you may be in for a pleasant surprise!

1. Do you have remote computer users that need access to your LAN, mini, or mainframe?
2. Would you be interested in eliminating a substantial portion of your expensive long-distance telephone charges?

Powerful, New Technology

Now, thanks to the emergence of a powerful new class of multiplexers, you can save up to $6,000 per user per year in operating and line costs AND save up to an additional $23,712 per year in long-distance charges for each phone line you replace!

> "Our company was wasting $83,712 a year without DATA RACE's MACH DS Mux"
> — MIS Manager

Be A Budget Hero!

With today's economic climate, corporate management will be pleased with Data Communication Managers that use this affordable, new technology as an easy, fast way to save on tight budgets.

New Industry Leader

DATA RACE, a long-time price/performance leader in the statistical multiplexer field, is introducing the industry's most cost-effective, high performance Voice/Fax/Data Multiplexer series. From 8 to 64 ports, the new MACH DS multiplexers include these 5 important features:

1. Toll-Free Voice and Fax
2. Up to 3 Voice channels per link
3. Multiple Digital or Analog links
4. Connects to existing facilities
5. Pays for itself in months not years!

Free, No Risk, 30-Day Trial

For a limited time, DATA RACE is offering a FREE savings evaluation survey and a FREE 30 day no-risk trial to qualified users. For details call 1-800 999-7223.

DATA RACE, 11550 IH 10 West, San Antonio, Texas 78230

Circle Reader Service No. **13**

NETWORKING MARKETPLACE

TRAINING

THE 1992 ICA SUMMER PROGRAM

When Educating People
to Build Your Internet
Don't Settle for Less Than

PEAK VALUE

That's what the ICA Summer Program delivers. With the 1992 technical program, **"LAN/WAN Interoperability: Managing the Internet,"** you get peak value in four ways:

- Professional education from the industry's best consultants and educators
- Hands-on laboratory applications
- Focused learning in a superb academic setting
- A price/performance value unmatched anywhere — a week of technical education, including dormitory accommodations and dining for under $1000 (under $1100 for non-members of ICA)

LAN/WAN Interoperability: Managing the Internet
The University of Colorado at Boulder
June 14-19, 1992

For a free brochure, call or write:

International Communications Association
12750 Merit Drive, Suite 710, LB-89
Dallas, Texas 75251-1240
1-800-422-4636 or Fax: 214-233 2813

International Communications Association

JUNE 14-19 BOULDER, COLORADO

LAN
X25 • T1
Available Soon
FRAME RELAY

TELETUTOR

FREE DEMO
1-800-542-2242
FAX (603) 433-2260
CALL FOR CATALOG OF ALL OUR COURSES

ICA & Interop East -

Special ICA & Interop East Show Issue - May 18

Closes: May 6

Bonus Distribution

Call for further information on advertising in this Special Issue:
800-622-1108

DATA COMMUNICATIONS

SUBRATE DATA MULTIPLEXER

Imagine an SDM system that lets you expand the number of users on your T1 network. This same system lets you combine low speed RS-232 data with the high speed data and voice already supported on your network. Coastcom's family of smart RS-232 Subrate Data Multiplexer (SDM) channel units integrate with the intelligent D/I MUX T1 multiplexer system. Expand your T1 with Coastcom's multi-user, multi-point, drop/insert SDM.

For more information call today
(800) 433-3433
Fax (510) 682-2015

COASTCOM *T1 Networking Specialists*
2312 Stanwell Dr.
Concord, CA 94520

SAVE 50% & MORE
ON MOST PRODUCTS
BUY/SELL/NEW/USED
Reconditioned With Warranty

Modems • Multiplexers • T-1 • CSU/DSU's • Channel Banks •

AT&T T-1 ESF CSU (New)	$1500
Codex CS 9600 FP Modem	$199
T.P. 557 CSU/DSU 56Kbps	$195
Infotron T-1 Equipment	60% Off
Datatel 9100	CALL
Tellabs 440 and 445	50% off
Newbridge Channel Banks	$4995
Omnimux 82 muxes-8 port	$695
N.E.T. IDNX Cards	CALL
Equinox DS-15's	CALL

METROCOM
(800) 364-8838
or (713) 783-8838
FAX (713) 783-8832 24 HRS

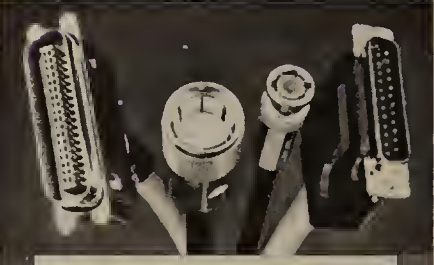
Interested In Advertising In Network World's Networking Marketplace?

We Have Sections For:

Bids & Proposals, Computers, Consulting Services, Datacommunications Equipment, Real Estate, Seminars, Software, Telecommunications Equipment, Training

Call Or Write:
Network World,
Shannon Summers,
161 Worcester Rd, Box 9172,
Framingham, MA
01701-9172;
800-622-1108

INSTALLATION SERVICES



Call for Cable
Save on custom assemblies or bulk cable & accessories
- Immediate Delivery
- Guaranteed Quality

ELEKTRO ASSEMBLIES INC.
522 - 6th Ave. NW, Rochester, MN 55901
(800) 533-1558
FAX (507) 288-9655

UNIQUE EDITORIAL

Every week, Network World provides information that helps users who design, purchase and implement enterprise networks.

Network World's Weekly Coverage

* News
* Industry Updates
* Telecommunications
* Data Communications
* Local Networking
* Management Strategies
* Products and Services
* Buyer's Guides/Features
* International Networks

Enterprise networking is the driving force in today's end user market and the driving force of Network World's editorial.

Reminder:

The April 27th Issue
Closes April 15th

The May 4th Issue
Closes April 22nd

PUBLICATIONS

Patricia Seybold's
Office Computing Group

Free-Trial Offer
to
Network Monitor
Guide to Distributed Computing

Start a trial subscription to *Network Monitor*, the leading monthly report on distributed network computing.

After reviewing your first issue, you can either pay the bill and continue receiving *Network Monitor* or write "cancel" and owe nothing.

Fax, phone, or write us with your name and address. *Network Monitor* is priced at $495 per year (Canada—$507; foreign—$519).

Fax: (617) 742-1028
Phone: (800) 826-2424 or (617) 742-5200
Mail: 148 State St. 7th Floor
Boston, MA 02109

TELECOM

WANTED
NORTHERN TELECOM ADD-ON MODULES
Baxter Healthcare Corporation wants Northern Telecom Modules
10 BUTTON (QMT-1) and 20 BUTTON (QMT-2).
MINIMUM QUANTITY 25.
Baxter will pay only for good working units.
(708) 578-5635

Upcoming Editorial & Show Coverage

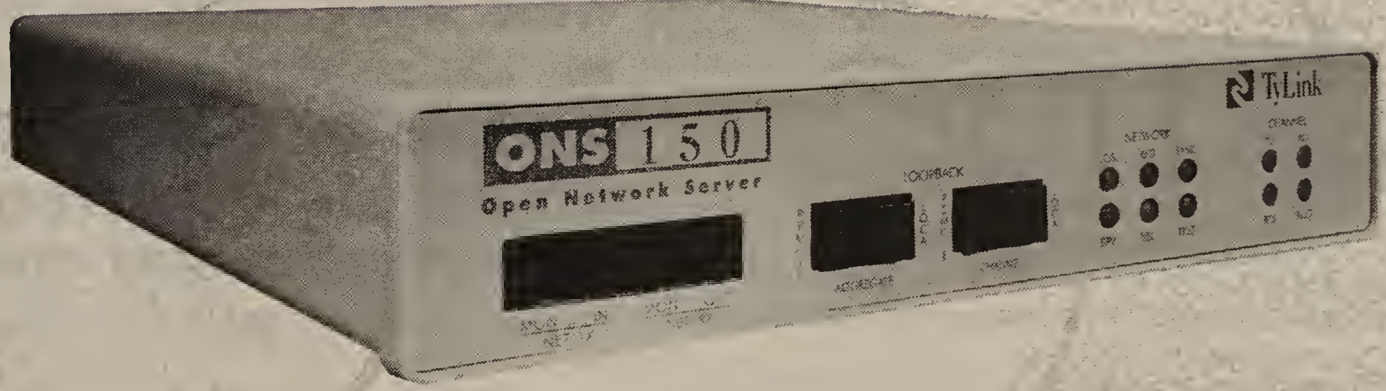
Apr 27 (Apr 15 Close); Topic: Applications; Buyer's Guide: Voice processors; Show Distribution: Downsizing/ Rightsizing Corp. Computing

May 4 (Apr 22 Close); Topic: Internetworking; Special Issue: SNA update; Lead Service

May 11 (Apr 29 Close); Topic: Internetworking; Buyer's Guide: Bridges

May 18 (May 6 Close); Topic: Special Applications; Annual critical issues facing users survey; GSPD: Open network management platforms; Show Distribution: ICA & Interop East; Lead Service

CONNECT FOR LESS!



Access The Carrier's T1 And FT1 Via The Most Cost Effective DSU/CSU Ever!

$1495.00

TyLink CORPORATION

1-800-828-2785
TyLink Corporation, 10 Commerce Way, Norton, MA 02766

Buy, Sell Or Announce Through Network World's Classified Section

Buying or selling communications-related products or services?
Or do you want to announce an upcoming event or business opportunity?
If so, Network World's classified section is the right choice for you.
You'll reach more than 150,000 communications/networking professionals all of whom are buying decision makers.
And you'll reach them every week.
Find out just how effective and cost efficient Network World classified advertising can be.
For all the facts write or call: Network World, Classified Advertising
Shannon Summers, 161 Worcester Rd, PO Box 9172, Framingham, MA 01701-9172;
800-622-1108 (in Mass., 508-875-6400)

NETWORKING CAREERS

International Data Corporation, the leading market research and consulting firm specializing in the information technology industry has the following opportunity available:

LAN Manager

This position will be responsible for administering and supporting a newly implemented 150 station network running Novell 386 3.11. Requires experience in hardware and software support and maintenance. In addition, candidate must possess user support experience.

Please send resume and salary requirements to Box 9015-LM, International Data Corporation, 5 Speen Street, Framingham, MA 01701. An equal opportunity employer.

IDC
INTERNATIONAL DATA CORPORATION

Introducing...

ResDirect

- ▶ *ResDirect* is a new on-line faxing service that allows you, the *Network World* reader to fax your resume and cover letter to any participating *Network World* recruitment advertiser directly from your personal computer.
- ▶ You can utilize *ResDirect* to make contact with as many advertisers as you like with the speed and privacy of never leaving your desk!
- ▶ *ResDirect* is free of charge to *Network World* readers.
- ▶ Simply log onto *Networking Careers On-Line* for full instructions and access to *ResDirect*.

To Log Onto.....

Networking Careers On-Line

If you're looking for more information on networking employment opportunities, as well as access to our new *ResDirect* service consult *Networking Careers On-Line*, a part of the *Network World* Bulletin Board System (BBS).

Networking Careers On-Line is a free service and can be accessed from any computer and modem by dialing:

508/620-1160 [300-2400 Baud]
508/620-1178 [up to 9600 Baud]

SYSTEMS ENGINEERS
Pre/Post Sales Support
$50K to $60K ++ *IBM 3270 SNA*

San Francisco - Atlanta - Washington, DC

SE need in above cities. To qualify: five+ years in a marketing capacity in pre-sales, design and implementation of data networking: 3270, SNA, TCP/IP, LAN to WAN interconnectivity, Token Ring.

New York City - Los Angeles - Connecticut

SE need in above cities. To qualify: five+ years in a marketing capacity in pre-sales, design and implementation of data networking: T1, T3, multiplexing, modems, X.25, LAN to WAN interconnectivity.

Other positions are available in both systems, sales, and management.

SSC National Placement
(215)789-7940 Fax (215)789-7950
Contact: John Grant/Bernadette McCall

F R E E

We will distribute your resume to over 500 "EMPLOYER FEE PAID" agencies across the country. We earn our revenues by splitting the employer paid fee once you are placed. If you are degreed and willing to consider relocation, send a copy of your resume to:

Advancement
Recruiting
P.O. Box 620083
Cleveland, OH 44102

TELECOM
ANALYST

Excellent company in S/E has opening for a Telecom Analyst with 3 years experience on SL1 Meridian System. Must have X-11, BARS and NARS. Pluses include ACD, Software Traffic Analysis and Traffic Engineering. Qualified candidates send resume and salary history to:

Jim Bostic
Phillips Resource Group
P.O. Box 5664
Greenville, SC 29606
803/271-6350 (Office)
803/271-8499 (Fax)
803/292-1181 (Home)

This May, Network World gives you an unbeatable combination of value and opportunity to recruit the most skilled and experienced networking, systems and communications professionals...

BONUS SHOW DISTRIBUTION EXTENDS YOUR REACH...

Our May 18th issue will have bonus distribution at both the ICA and Interop trade shows!

ICA: With our bonus issues at the International Communications Association conference and show in Atlanta, GA, you'll reach 12,000 end-user datacommunications and telecommunications professionals from some of the largest global corporations.

Interop/East: Bonus issues will be distributed at Interop in Washington, D.C. reaching 20,000 professionals involved in all facets of systems integration and internetworking.

TARGETED EDITORIAL FOCUSES ATTENTION...

May 11.....Comprehensive Buyer's Guide to Bridges
May 18.....1. Annual Critical Issues Facing Users survey
2. Guide to Open Network Management Platforms
May 25.....Interexchange Carrier Options

SPECIAL SAVINGS OPPORTUNITY...

With your ad in our May 18 special issue, you can reinforce your recruitment message by running it in the May 11th pre-show issue or the May 23rd post-show issue for 75% off! Repetition will give you increased visibility and response for only a fraction more cost.

AD CLOSINGS...

ISSUE	SPACE DEADLINE
May 11	Wednesday, April 29
May 18	Wednesday, May 6
May 25	Wednesday, May 13

DON'T WAIT...

Call your *Networking Careers* Sales Representative today for more details or to reserve your advertising space.

Bill Reinstein, National Sales Director
Pam Valentinas, Eastern District Mgr.

(800) 622-1108
Fax: (508) 879-3167

NETWORK WORLD

IBM preps open LAN platform

continued from page 7

compliant and will incorporate technologies from Hewlett-Packard Co.'s OpenView and Open Software Foundation, Inc.'s (OSF) Distributed Management Environment (DME). He added, however, that introduction of the system does not hinge on the release of initial DME code from the OSF.

The IBM system will communicate with network devices using both the Common Management Information Protocol (CMIP) and Simple Network Management Protocol.

"[With this architecture,] IBM is providing a single, portable view of network management," said Frank Dzubeck, president of Communications Network Architects, Inc. in Washington, D.C. "IBM said it was going to provide OSI-compliant network management capabilities. Nobody believed them, [but] now it's here."

More than adequate

IBM has been called "LAN insensitive" in the past, coming out with a mixture of LAN management products that left many users frustrated. IBM's overall strategy for managing LANs was unclear until now.

John McConnell, vice-president of Infonetics Research Institute in Boulder, Colo., said, "IBM's LAN strategy has only been adequate in the past. This puts them in the forefront of LAN management vendors."

Having CMIP support on its LANs and on the mainframe-based NetView also improves NetView's scope of LANs and attached personal computers. "It makes a clear shot all the way to the desktop for NetView — a vision NetView never had before," McConnell said.

It also rids users of having to deal with cumbersome Network Management Vector Transports, the traditional Systems Network Architecture management protocols.

While IBM officials were willing to talk about the LAN management platform, they only provided sketchy details about how similar systems would be implemented on other processors. For the mainframe, for example, they said only that NetView "could evolve" into this type of open management environment.

In addition to laying out their strategy for the open LAN manager, IBM executives also discussed a new set of applications dubbed Configuration, Installation and Distribution (CID).

CID tools, which will appear in the fall, will run under DSM and help users electronically copy, modify or update applications and operating systems, as well as configure devices across a LAN from a local workstation or a host.

Ultimately, CID tools, which IBM did not provide specific names for, will let users distribute IBM and non-IBM software and updates any time of the day without end user involvement. In the initial rollout of CID products, end users will be required simply to insert two diskettes into their devices and leave them powered up to receive new software or upgrades. .

CID will feature new software design tools and extensions to NetView Distribution Manager (DM) at the mainframe and the OS/2-based NetView DM/2 at the LAN level.

NetView DM is mainframe-based software used to provide central distribution of data, software and 3174 microcode within SNA environments. NetView DM/2 provides local distribution of data and software.

Other CID products will include add-on OS/2-based software, along with configuration and administration tools to help build CID command-and-response files.

"This is a major upgrade to IBM's distribution products," Dzubeck said. "This is IBM's real distribution architecture. It's scalable from the LAN up, and it will be able to distribute anything, anywhere. It's an industrial strength product rollout."

From an OS/2-based node, an adminisrator using CID tools will be able to initiate and monitor software distribution. The administrator can load a single copy of a program onto a so-called code server, which will be used to distributed copies to all target devices on a LAN.

In a mainframe-centric environment, the administrator's node is attached to the mainframe. It sends upgrades to the CID-based NetView DM, which sends code to the code server over IBM's LU 6.2-based SNA Distribution Services. From there, updates are distributed locally using Network Basic I/O System.

"Many users perform this function today [with other vendor's products]," said IBM's Rosen. "We will be providing a product to do this so they won't have to [go to a third party]. Users will be able to manage their configuration and application distribution more efficiently, and there will be new tools to better tailor their systems."

Today, NetView DM and NetView DM/2 can perform only a limited set of CID's ultimate functions. For example, NetView DM can send out software but cannot confirm that the software was received properly at the receiving node. CID will allow users to monitor the process and verify that it is occurring properly.

Rosen said IBM is working with other vendors to provide tools that fit with the CID blueprint.

"We are actively pursuing [independent software vendors] to make up some of the missing pieces to CID," he said. "There is no reason why others shouldn't be able to plug and play in this environment. We are not precluding any competitors or homegrown solutions from this architecture."

Senior Editor Caryn Gillooly contributed to this story.

IBM offers 'skinny stack'

In order to provide better access to SNA resources for local-area network-attached devices, IBM intends to offer a client/server version of its OS/2 Communications Manager.

In this version, a single OS/2 machine would run the entire Systems Network Architecture communications stack, while other OS/2 clients would run a smaller "skinny stack" of SNA protocols, reducing memory requirements for all but the server.

IBM's current OS/2 Communications Manager requires full-function SNA stacks on each workstation. The skinny stack would be licensed in addition to the Advanced Peer-to-Peer Networking end and network node capabilities IBM already offers for OS/2 machines.

"IBM is trying to take a program that requires 5M bytes to run and squeeze it down to 500K bytes," said Joe Mohen, vice-president of Proginet Corp. in Uniondale, N.Y. "It will let users and possibly other vendors implement SNA more efficiently."

For example, IBM is working with Novell, Inc. to implement the skinny stack on NetWare clients.

"Getting Novell networks more tightly integrated with SNA networks is our primary focus with the split-stack implementation," said Bob Roth, manager of IBM-Novell Relationship at IBM's Networking Systems. "But we want to do it with others."

Analysts said the Novell implementation could appear by the end of the year.

— *Michael Cooney*

IBM details LAN course for '90s

continued from page 1

cording to IBM.

First, Sager said, Big Blue will bring out "filtering products" that will let individual workstations support the higher transmission speeds over IBM's Type 3 unshielded twisted-pair cabling. Although he would not be more specific, analysts predicted that IBM intends to bolster the filtering capability of its existing Token-Ring adapters to support higher speeds.

IBM will also enhance its existing 8230 Controlled Access Unit (CAU) — its intelligent concentrator — with new filtering capabilities, so all devices attached to the CAU will be able to run at 16M bit/sec, according to Sager. A user could move to the 16M bit/sec unshielded twisted-pair token ring by upgrading CAU instead of the existing 4M/16M bit/sec cards within user workstations.

Sager stressed that IBM's unshielded twisted-pair products are being developed solely by IBM. Some analysts had questioned whether IBM's offerings would be jointly developed with SynOptics Communications, Inc., which has worked with IBM on a proposal for a 16M bit/sec unshielded twisted-pair standard.

By the end of June, IBM is expected to provide support for Fiber Distributed Data Interface networks in the form of personal computer-based FDDI adapter cards. The company is also working on FDDI bridging and management capabilities.

Big Blue currently offers FDDI adapters for its RISC Sys-

(continued on page 50)

Firm readies finance pack

continued from page 1

said the applications, which were praised by a beta user, are targeted at companies looking to replace older mainframe financial applications with systems that are more adaptable and scalable and take advantage of the distributed networks in place today.

The new financial applications were built using the company's own client/server development tools.

The PeopleSoft Financials include PeopleSoft General Ledger (PS/GL), PeopleSoft Accounts Receivable (PS/AR), PeopleSoft Accounts Payable (PS/AP) and PeopleSoft Asset Management (PS/AM). In addition, the firm is introducing PS/nVision, an interactive graphical reporting and query tool.

Analysts said PeopleSoft is providing the "next-generation technology" for this core business requirement.

"PeopleSoft has grabbed the technology lead," said Bill McNee, program director of software management strategies with Gartner Group, Inc. in Stamford, Conn. "As users grapple with reengineering to take advantage of the emerging 1990s platform, PeopleSoft is well positioned to emerge as a top-tier supplier [in the financial accounting arena]."

The relational edge

Because the PeopleSoft Financials utilize existing relational database facilities to store financial information, users would not have to deal with any limits on the volume and variety of financial data that can be stored and processed. This means users can customize applications features and integrate the systems with other applications more easily.

Customers can use the company's PeopleTools development tools included with the applications to make changes and build new record definitions via a Windows-based graphical editor.

One beta user, the New York State Department of Civil Service, is testing the financial software in conjunction with PeopleSoft's benefits application to manage its Insurance Enrollment benefits program for the state's 1.2 million employees.

Henry Nahal, director of telecommunications and information management, said the state is running the server portion of the benefits application on a DB2-equipped mainframe in Omaha, Neb., supporting hundreds of end users. The company is running the financial applications on Banyan Systems, Inc. LANs supporting Gupta Technologies, Inc. SQLBase.

"With so many pieces to pull together, I could hardly believe it when the whole system ran smoothly," said Nahal. "All the insurance broker and billing requirements of our enrollment benefits program will now be handled by the financial applications and be fully integrated."

The PeopleSoft Financials will be released over the next 12 months for Gupta's SQLBase and Microsoft's SQL Server on OS/2, IBM's DB2 on MVS, Hewlett-Packard Co.'s ALLBASE/SQL on MPE/XL, Oracle Corp.'s database on HP-UX and Digital Equipment Corp.'s Rdb on VAX/VMS.

PS/GL pricing, which includes PS/nVision, ranges from $160,000 to $300,000, depending on the server platform. PS/AR, PS/AP and PS/AM are scheduled to ship in the first quarter of 1993. Each product ranges from $100,000 to $200,000, depending on the platform.

Utility crafts private SONET net

continued from page 1

solescence," said Jeff Hafer, GPU's telecommunications manager. "We decided to invest in the future."

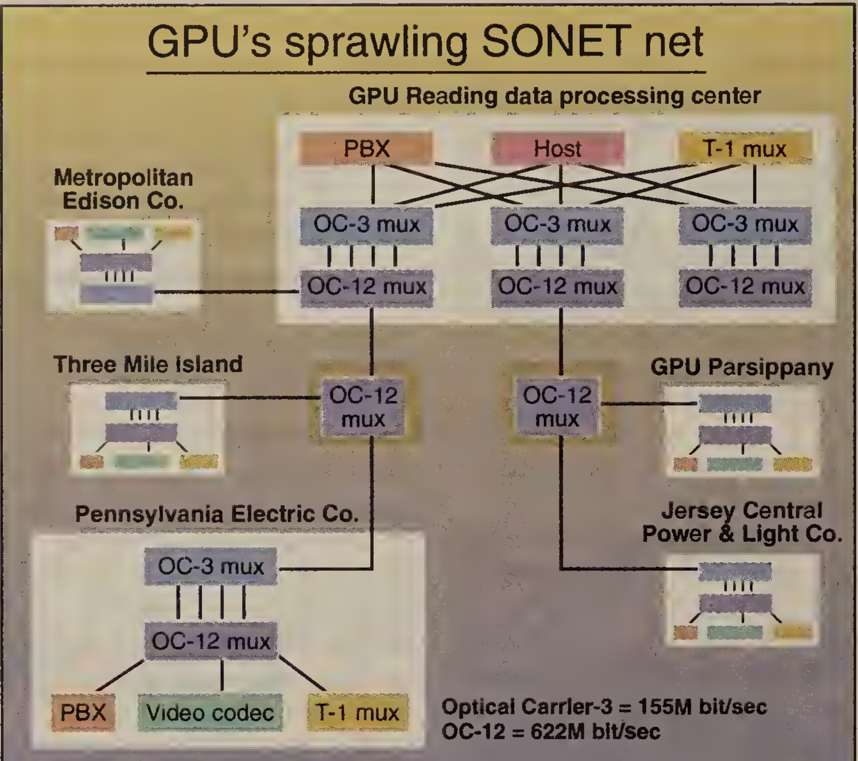
The hub of the network is GPU's Reading, Pa., data processing center, which terminates three fiber-optic SONET backbone links, one of which serves a local site and two others that extend to remote facilities (see graphic, this page). The fiber is being run along company-owned rights-of-way and will support a string of substations and other corporate facilities.

At the Reading hub, private branch exchanges, T-1 multiplexers and host computers are connected to each of three AT&T Network Systems DDM-2000 Optical Carrier (OC)-3 optical multiplexers, which multiplex multiple electrical T-1 feeds at up to 155M bit/sec. The OC-3 outputs are then fed into a DDM-2000 OC-12 optical multiplexer that multiplexes the signals into a 622M bit/sec OC-12 optical signal.

Two of the three legs of the net support a string of power substations, which are equipped with DDM-2000 OC-12 multiplexers, and multiple administrative offices of GPU subsidiaries.

All offices are configured with a mirror image of the equipment at the hub. The DDM-2000 OC-12 multiplexers are used to break the optical signal down into OC-3 feeds, which, in turn, are broken down into T-1 links by OC-3 multiplexers.

GPU's sprawling SONET net



General Public Utilities Service Corp.'s Synchronous Optical Network will carry voice traffic as well as support LAN interconnection, videoconferencing and imaging. The network is also used to support a power management application and power substations (not shown).

GRAPHIC BY SUSAN SLATER

SOURCE: AT&T NETWORK SYSTEMS, MORRISTOWN, N.J.

Besides LAN interconnection, videoconferencing, imaging applications and voice communications, the network will be used to support a bread-and-butter power management application.

Remote terminal units, which are used on the power grid to monitor power flow and collect voltage and current readings, will send this critical data back over the net to the appropriate subsidiary's control center, Hafer explained. This data is currently supported on 9.6K bit/sec analog multidrop private lines.

Integrated with that application will be LAN internet traffic carried at 768K bit/sec or higher. GPU currently links LANs using 256K to 448K bit/sec dedicated microwave links.

"We anticipate needing much bigger pipes to connect them in the very near future," Hafer said.

GPU also plans to migrate its five-site videoconferencing network to the SONET backbone, a system that requires 672K bit/sec of bandwidth between sites.

Computer-aided design applications will also require from 768K to 1.544M bit/sec of bandwidth, according to Hafer. "It takes a lot of bandwidth to [download] a drawing," he said. "And the person doesn't want to wait 20 minutes for it."

GPU is just now beginning to use an imaging application that will enable engineers to call up documents with text and graphics from a compact disc. Hafer expects the imaging application to grow in popularity and require large amounts of bandwidth when images are transmitted from one LAN to the next.

GPU kicked off the networking project last July by installing private fiber alongside its analog microwave routes in Pennsylvania and Northern New Jersey but had not yet acquired the electronics for the network.

Although the company initially had considered using standard fiber equipment, it ultimately decided to go with SONET to gird against obsolescence. Furthermore, the company went for the more expensive 622M bit/sec OC-12 electronics for the backbone links instead of the lower speed OC-3 equipment that offers 155M bit/sec.

"The difference in cost between OC-3 and OC-12 was not going to be significant enough for us to take the lower speed equipment and possibly be in trouble [in terms of available bandwidth] three or four years down the road," Hafer said. "We went with OC-12 because, although we were doubling the cost, we were quadrupling the amount of bandwidth." ◘

IBM enhances IRM system

continued from page 4

tems to extract key data from scanned paper forms. That data is then stored in an object server that can be accessed by workers in various government agencies.

"Users are buying IRM to write their own customized client/server image applications," said Mike Miller, manager of IBM's public-sector image center in Sacramento, Calif.

Duke Power, a utility company based here, plans to use IRM to facilitate the sharing of spreadsheets, text documents and large binary files, such as blueprints, computer-aided design files and vector images. Eventually, Duke Power plans to use the system to store and distribute sound and video files for applications such as education and training.

"[IRM] allows us to integrate more tools than any other solution that we have looked at," said Terry Middleton, project manager for Duke Power's Corporate Document Management project.

Duke Power has a Systems Network Architecture net that consists of more than 6,000 IBM workstations linked by about 200 LANs, most of which are IBM Token-Ring Networks. Duke Power plans to implement IRM object servers on its IBM 3090 mainframe as well as distributed LAN servers and high-end IBM Personal System/2 client workstations running OS/2.

IRM software for IBM MVS/ESA mainframes ranges in price from $175,000 to $320,000, depending on system configuration. IRM software for OS/2 costs from $1,500 to $2,200 per station, depending on the number of nodes that are supported. ◘

Banyan to ink AT&T deal

continued from page 2

February 1991 when the companies agreed to jointly develop and market products. The vendors certified versions of VINES and VINES SMP for use on AT&T's StarServer E Symmetric Multiprocessor System, StarServer E uniprocessor computers and StarLAN 10 network boards. That agreement was signed before AT&T bought NCR.

William Posner, conference chairman, declined to comment on the anticipated alliance but did say Banyan's growing willingness to team with established vendors is good for users.

"These deals are very important in that they bring Banyan out into the limelight, which I think it really needs," he said. "It may provide a good alternative for users who don't yet know what Banyan can do."

IBM links

Separately, Banyan is expected to unveil the first fruits of a strategic partnership with DCA announced last October. That deal was designed to better integrate the VINES and IBM Systems Network Architecture networks.

Banyan is expected to announce a renamed and repackaged version of DCA's IrmaLAN/EP gateway software that will be customized for VINES, sources said.

The software will enable clients on VINES nets to emulate 3270 terminals to communicate

---

Congress takes on net reliability

continued from page 4

little to correct vulnerabilities.

The agency has set up an industry advisory group to recommend ways to improve net reliability. It has also instituted rudimentary requirements for carriers to report outages affecting 50,000 or more users.

Despite congressional urging, FCC Chairman Alfred Sikes continues to hold firm to the unpopular view that the agency has no business setting service quality standards. He said the FCC should be only one of several public and private groups working to improve net reliability.

"I believe that when the government sets standards, it frequently creates a safe harbor for inferior performance," he said.

Markey disagreed, saying,

IBM execs detail firm's course

continued from page 49

tem/6000 and its 3172 controller. However, executives last week confirmed that IBM will meet the goals listed in a statement of direction circulated two years ago in which IBM pledged to have additional FDDI products and support by this June.

The PC-based adapter cards will let LAN servers and LAN clients attach to an FDDI backbone. With FDDI on the backbone, however, IBM is forced to add FDDI support to its bridges, which the firm has acknowledged.

"We intend to provide [FDDI] bridging [capabilities]," Sager said. IBM currently offers two bridges: a software-only bridge and the 8209 combination software/hardware bridge.

Sager said the firm plans to release an FDDI management solution, although he declined to give more details. Analysts predicted, however, that the next release of IBM's LAN Network Manager, a centralized LAN management package, will support FDDI nets.

IBM executives said the company is looking into the possibility of supporting 100M bit/sec FDDI nets over shielded twisted-pair cabling, but they would not be more specific. Sager did say, however, that at the same time IBM releases its upcoming FDDI products, it will also reveal which of the two rival FDDI-over-shielded twisted-pair standards it intends to support.

Grand LAN plan

Officials also discussed a number of other technologies IBM is currently exploring, including wireless communications.

Donald Haile, IBM's new director of the LAN Systems group here, said that as workers become more mobile and computers get smaller, there will be a growing interest in wireless communications. "We're looking seriously at packet [radio] and cellular communications," he said, adding that the company is also looking into the wireless LAN arena.

At this point, however, IBM has not decided which type of wireless LAN technology it would use or whether it would make its own wireless LAN products or resell another vendor's.

Haile also said the company plans to enter the Ethernet market, not only with Ethernet cards, but also possibly through dual-protocol chipsets that would provide both Ethernet and token-ring connectivity on a single LAN card. Ultimately, support for both types of networks could be built into a PC's motherboard.

"Traditionally, we've been the token-ring shop. But we see Ethernet as an area customers would like us to play in," he said.

with IBM hosts.

The repackaged IrmaLAN/EP offering will support DOS, Apple Computer, Inc. Macintosh and Microsoft Corp. Windows clients. Pricing was not available.

According to John Male, president of iLAN, Inc., a Columbus, Ohio, network reseller, the IrmaLAN/EP gateway software for VINES will use VINES sockets, obviating the need to use IBM's Network Basic I/O System at the workstations.

Down the line, Banyan and DCA are planning to roll out a VINES communications server, an offering that will provide more functionality than the gateway software.

Senior Editor Caryn Gillooly contributed to this story.

"When it's everybody's responsibility, it's nobody's responsibility."

Congress is not the only group skeptical about Sikes' handling of outages. FCC Commissioner Ervin Duggan has pushed for more FCC action for longer than a year.

"If the FCC doesn't [take responsibility for net quality], I'm hard put to know where that kind of attention will come from," Duggan said at the hearing.

Sager agreed, noting IBM will consider providing the products through an OEM agreement with an existing Ethernet supplier. He also mentioned the possibility of providing Ethernet management capabilities, but he declined to give more specifics.

Although IBM would not provide details regarding dual-protocol chipsets, analysts speculated that IBM would jointly develop such a product with National Semiconductor Corp., which is involved in a technology exchange agreement with IBM.

IBM also outlined plans to bring out network adapters with built-in concentrator ports. The firm said it would introduce an adapter card that supports eight-port concentrators attached to it. This could save users money by enabling them to attach as many as eight additional users to a network through a single card. It could also be used in a superserver environment to attach multiple LAN segments to a single network interface card.

In the longer term, Haile discussed IBM's intention to bolster LAN support for multimedia capabilities. He discussed making it easier to deploy multimedia applications on a LAN by providing support for isochronous communications. Isochronous technology lets asynchronous communications equipment communicate synchronously.

Notes 3.0 improves integration

continued from page 2

Currently, Notes server software requires OS/2 and supports clients on OS/2, DOS and Microsoft Corp. Windows.

Notes 3.0 will still require OS/2 for the server but will let Notes users reach into NetWare environments in two ways. Notes 3.0 clients will support the Vendor Independent Messaging (VIM) interface, allowing them to address an MHS server or any other server that supports VIM directly. On the back end, Lotus will provide a Notes-to-MHS gateway that will also use VIM to route messages between Notes and MHS servers.

Version 3.0 will also support NetWare's native net transport protocol, Novell's Internetwork Packet Exchange (IPX), for the first time. "As Novell improves IPX, we will be able to evolve Notes services, whereas if we are running on [IBM's] NETBIOS, there's nothing we can do," Rogers said.

The NLM version of Notes will offer the same services but let NetWare users run Notes without buying a separate server. The Notes NLM will integrate with NGM 3.2 through an NLM version of the Notes 3.0 MHS gateway. NGM, in turn, will be able to route Notes messages through a number of different mail systems when it becomes available ("Novell unveils grand NetWare -mail plan," *NW*, March 30).

Integrating Notes messaging services with NetWare, however, is only the beginning, according to Rogers. "We see this as a process to start integrating the full range of Notes services tightly with NetWare," he said. "The next step is to integrate [it] with NetWare directories and management."

MCI launches new int'l service

continued from page 2

encing and local-area network interconnection are driving the need for the new service. Several users have already signed up for the service but she declined to name them.

Daniel Briere, president of TeleChoice, Inc., a consulting firm in Montclair, N.J., agreed. "Users have been clamoring for international switched data for a while," he said.

In May 1988, AT&T rolled out the service to France and now offers it in 18 countries. Sprint Corp. also offers a similar international service.

MCI's international switched data service is offered through either Vnet or Prism I, an outbound calling service for midsize businesses. Integration with these services will enable MCI to bundle switched data bills into existing service bills. Sirmai said the carrier plans to roll out switched data at an unspecified date for users of Vision, a flat-rate service for customers spending as much as $50,000 per month.

Although MCI offers switched data domestically at regular Vnet voice rates, the charges for international switched data will be about double the cost for voice. For switched data calls to the U.K., MCI will charge $1.38 for the first 30 seconds and 20 cents for each additional six seconds.

Service to Canada, which is available initially only at 56K bit/sec, will be distance-sensitive. The rate for a call of 3,000 miles or more using dedicated access is 31.3 cents for the first 30 seconds and 5.3 cents for each additional six seconds.

Access to MCI's switched data service to Japan and the U.K. is via the Primary Rate Interface. Customers can use switched or dedicated access for MCI's switched data service to Canada.

MCI will offer its new service with British Telecommunications PLC in the U.K. and Telecom Canada in Canada. Although the carrier has not filed a tariff for service to Japan, Sirmai expects those rates to be $2.57 for the first 30 seconds and 24 cents for each additional six seconds.

For calls to Japan and the U.K., MCI is slightly undercutting AT&T, which offers its switched data service through its Accunet family (see graphic, page 1).

AT&T's prices for calls to Canada are considerably higher than MCI's. An AT&T call of 3,001 miles or more using dedicated access costs 52.5 cents for the first 30 seconds and 9.9 cents for each additional six seconds.

IBM rolls out OS/2 Version 2.0

continued from page 4

claims is 2½ times faster than the previous one.

IBM also split its Extended Services for OS/2 away from OS/2 Extended Edition. It is selling the database and communications server that make up the Extended Services for $1,995 per server and $75 per client. A single-user version sells for $595.

Distributed Data Connection Services, software that allows users to connect a local-area network database to a host database, also shipped last week. It costs $500 for a LAN database and $4,680 for a host.

In May, IBM and Novell will ship two NetWare services that work natively with OS/2 Version 2.0's 32-bit architecture and Workplace Shell. A NetWare client that works with OS/2 Version 2.0 will be called NetWare for OS/2, despite the fact that it is the name Novell uses for its NetWare server for OS/2, according Art Olbert, personal systems director for IBM LAN systems.

The other service, NetWare Services for OS/2, will offer the NetWare system management tools in a graphical Workplace environment. Neither has been priced, although Olbert said they will sell for a nominal fee.

NetWare 3.2 for OS/2, the NetWare server for OS/2, will ship with the OS/2 2.0 NetWare client and include management services, Olbert said.

OS/2 Version 2.0 will be available directly from IBM until July 31 for $139 by calling (800) 342-6672. Also, Windows users can upgrade for $49, and DOS users for $99.

IDEA rolls out Ethernet support

continued from page 4

but IDEA is evaluating Fiber Distributed Data Interface support, which would position the controller more closely with IBM's 3172 Interconnect Controller.

The 3172 attaches FDDI, Ethernet and Token-Ring LANs to the mainframe channel. According to Berman, IDEA is waiting for FDDI prices to decrease and the FDDI market to pick up before adding such support to Concert.

Future considerations

Other features IDEA is mulling over for Concert include Reduced Instruction Set Computing microprocessors and bridge/routing capabilities as well as support for IBM's Advanced Peer-to-Peer Networking protocols, Berman said.

Release 1.2.3 is available now with the purchase of a Concert controller. The new controllers range in price from $2,995 to $21,695.

Firm to enhance FDDI bridge

continued from page 4

plications for archiving configuration data, traffic and performance analysis, in addition to other administration tasks.

ViewMaster+ is priced at $20,000, and the Ingres database enhancement costs $5,000.

FiberCom is also expected to unveil SecureMan, which enables the bridge to be used with a public metropolitan-area net service.

The software, which resides on a SPARCstation and works with ViewMaster+, offers an in-band security protocol that can switch traffic across bridge ports on a software-selectable, per-port basis. This enables different end-user companies to share bridge hardware and bandwidth on common FDDI-based metropolitan-area networks, Wellman explained.

SecureMan also gathers port-level frame and byte statistics that can drive a billing system. It costs $5,000.

All RingMaster bridge enhancements will be available in mid-May and demonstrated at INTEROP 92 Spring next month.

NETWORK WORLD

161 Worcester Road
Framingham, Mass. 01701-9172
(508) 875-6400

Second-class postage paid at Framingham, Mass., and additional mailing offices. *Network World* (USPS 735-730) is published weekly, except for a single combined issue for the last week in December and the first week in January by Network World, Inc., 161 Worcester Road, Framingham, Mass. 01701-9172.

To apply for a free subscription, complete and sign the qualification card in this issue or write *Network World* at the address below. No subscriptions accepted without complete identification of subscriber's name, job function, company or organization. Based on information supplied, the publisher reserves the right to reject non-qualified requests. Subscriptions: 1-508-820-7444.

Non-qualified subscribers: $5.00 a copy; U.S. — $95 a year; Canada, Central & South America — $110 a year; Europe — $165 a year, all other countries — $245 a year (airmail service). Four weeks notice is required for change of address. Allow six weeks for new subscription service to begin. Please include mailing label from front cover of the publication.

Network World can be purchased on 35mm microfilm through University Microfilm Int., Periodical Entry Dept., 300 Zebb Road, Ann Arbor, Mich. 48106.

Network World is distributed free of charge in the U.S. and Canada only to qualified management or professionals who specify and maintain communications equipment and systems, including voice, data and video, as well as to common carriers, consultants, systems houses and manufacturers of communications equipment.

PHOTOCOPY RIGHTS: Permission to photocopy for internal or personal use or the internal or personal use of specific clients is granted by Network World, Inc. for libraries and other users registered with the Copyright Clearance Center (CCC), provided that the base fee of $3.00 per copy of the article, plus 50 cents per page is paid to Copyright Clearance Center, 27 Congress Street, Salem, Mass. 01970.

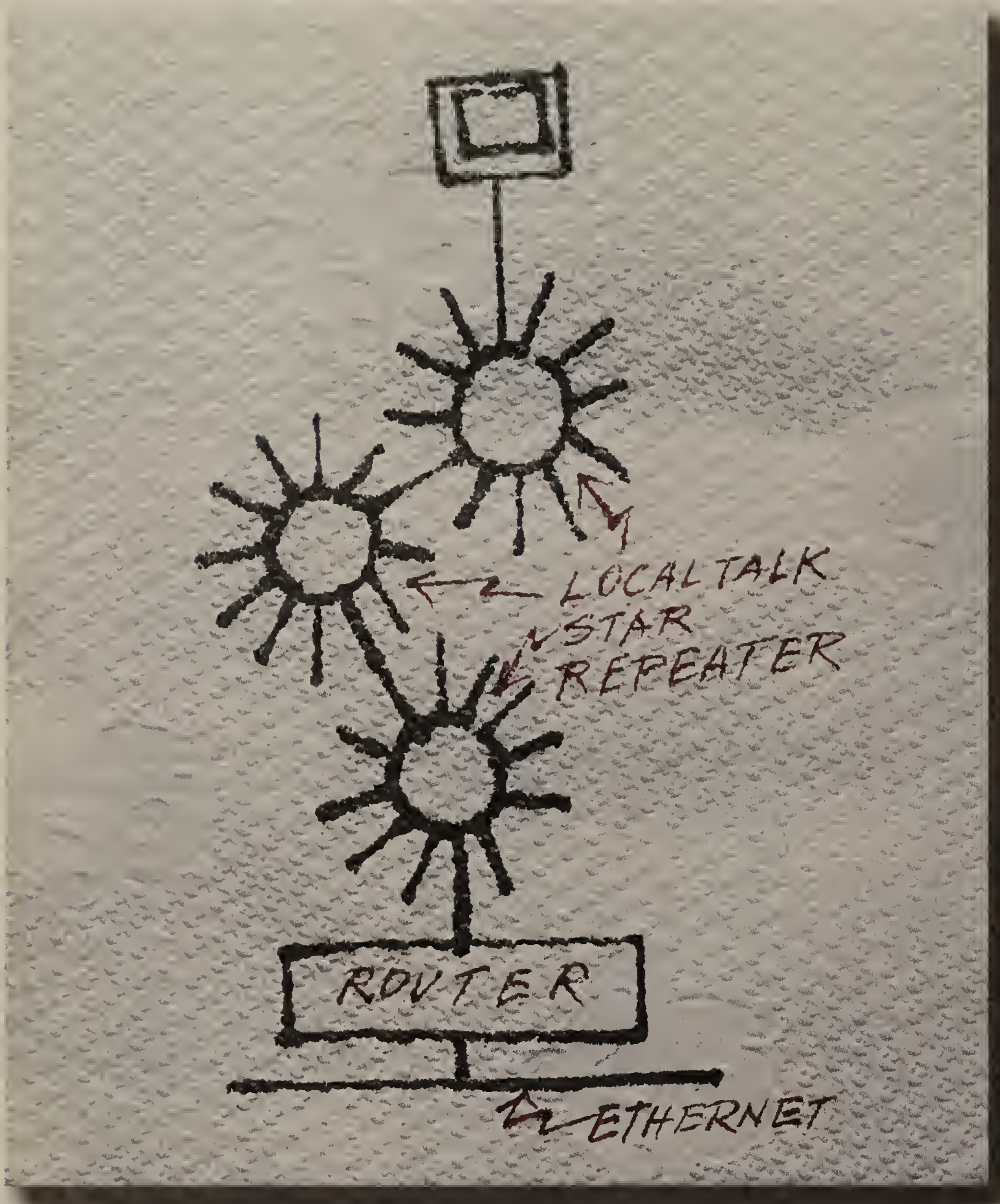
POSTMASTER: Send Change of Address to *Network World*, P.O. Box 3090, Northbrook, IL 60065.

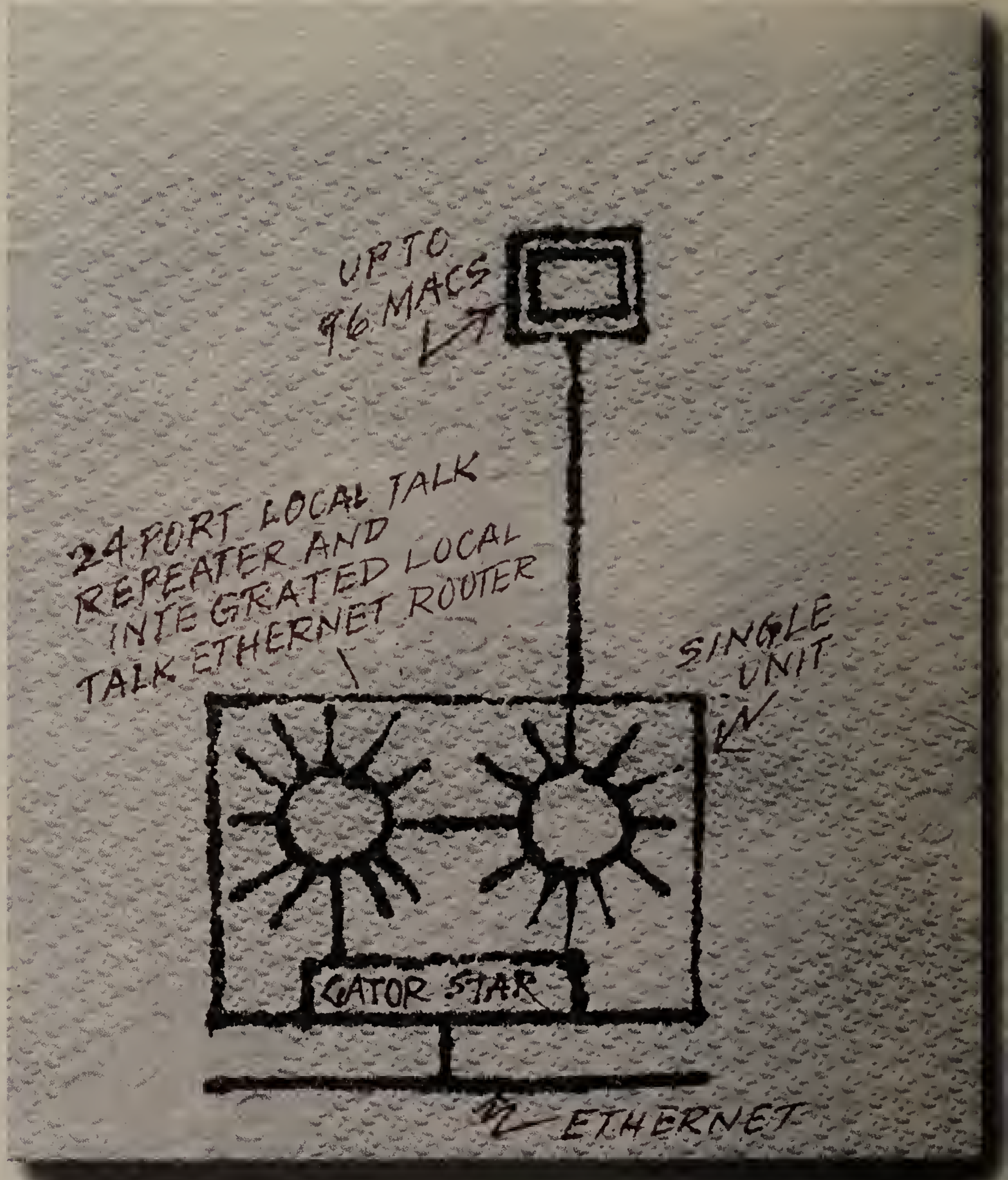
Copyright 1991 by Network World, Inc. All rights reserved. Reproduction of material appearing in *Network World* is forbidden without written permission.

BPA

Reprints (minimum 500 copies) and permission to reprint may be purchased from Donna Kirkey, Network World, Inc., 161 Worcester Road, Framingham, Mass. 01701-9172.

STAR FLEET. THE NEXT GENERATION.




UP TO 96 MACS
24 PORT LOCAL TALK REPEATER AND INTEGRATED LOCAL TALK ETHERNET ROUTER
SINGLE UNIT
GATOR STAR
ETHERNET

GatorStar, GatorBox and Cayman Systems are registered trademarks of Cayman Systems, Inc. All other product names are trademarks of their respective manufacturers.

Now you can boldly go where no active star network has gone before. With GatorStar GX™.

The first LocalTalk-to-Ethernet router-repeater that integrates the active star capabilities of a 24-port LocalTalk repeater with a high performance, multiprotocol gateway.

Unlike daisy chaining, GatorStar combines two 12-port active star repeaters with the most powerful, most advanced LocalTalk-to-Ethernet gateway ever to be developed, the GatorBox CS®.

The result is that up to 96 Macintosh users can share files, e-mail and printers with every Macintosh, UNIX, Digital (Pathworks) and PC user on your Ethernet.

It also means that GatorStar is easier to manage than separate repeaters and routers. For instance, you can readily locate individual Macs or restart ports from any Macintosh or UNIX workstation on the network.

GatorStar's 16.7 MHz 68302 processor and direct memory access provide the fastest LocalTalk I/O around. And both your LocalTalk and Ethernet traffic can be managed by dedicated DMA channels. Which means a quantum leap in both I/O response and performance.

The Case for GatorStar GX

The Repeater

- ☐ 24-port LocalTalk active star repeater
- ☐ Supports up to 96 LocalTalk devices
- ☐ 100% compatible with Farallon's PhoneNET® StarController® cabling
- ☐ Maximum cable length of 3,000 feet per port

The Router

- ☐ Ethernet-to-LocalTalk router/gateway
- ☐ TCP/IP, MacTCP, and MacIP support
- ☐ DECnet Phase IV, Digital PATHWORKS support
- ☐ AppleTalk Phase 1 and 2
- ☐ Configuration, monitoring, and upgrades from anywhere on network
- ☐ SNMP and atalkad support
- ☐ Cayman tunneling over IP backbone
- ☐ 16.7 Mhz 68302 CPU, 2 Mbytes, DMA I/O
- ☐ National Semiconductor's SONIC Ethernet chipset
- ☐ Repeater and Router status via *telnet*
- ☐ Serial port out-of-band diagnostics
- ☐ Optional UNIX-AppleShare file sharing
- ☐ Optional UNIX-AppleTalk printing

The Bottom Line

- ☐ Integrated LocalTalk-Ethernet repeater/router
  - $3,595 *GatorStar GX•M* for Cabletron's MMAC
  - $3,895 *GatorStar GX•R* for 19-inch rack
- ☐ 2 year Cayman hardware warranty
- ☐ No hassle, overnight replacement policy

GatorStar supports multiple protocols like AppleTalk, TCP/IP, DECnet and SNMP as well as GatorShare™ and GatorPrint™ software that lets Macintosh users access UNIX servers and UNIX users print to AppleTalk printers.

And because its ports are compatible with Farallon's Star Controller Series 300, you can use existing PhoneNET system® wiring.

Plus, GatorStar comes in both a 19-inch rack mount version for wall mounting or stacking on the tabletop and a single-board, MIM version for Cabletron's MMAC (Multi-Media Access Center) concentrator family.

Plus, GatorStar is available with a very impressive support plan that includes a two-year hardware warranty and optional GatorCare™ software support.

Call **1-800-473-4776,** 1-617-494-1999 or fax 1-617-494-9270 and have us give you all the details.

Because while the ability to travel to the stars may be centuries away, the ability to control them is already here.

CAYMAN
SYSTEMS

Cayman Systems, 26 Landsdowne St
Cambridge, Massachusetts 02139
Internet address: sales@cayman.com.
AppleLink: CAYMAN.SALES

Includes Valuable Savings From 12 Network Management Vendors*

*The AG Group, Caravelle Networks Corp., Cayman Systems Inc., CSG Technologies, Distributed Technologies Corp., The Graphic Management Group, InterCon Systems Corp., MacVONK USA, Neon Software Inc., ON Technology Inc., TechWorks, Trik Inc.